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Agriculture

Forest
Service

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McKenzie River Ranger District

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Wildlife Biological Evaluation for the Flat Country Environmental Impact Statement, McKenzie River Ranger District, Willamette National Forest

I. Introduction

The purpose of this Biological Evaluation is to review the Flat Country Project on the McKenzie River Ranger District in sufficient detail to determine whether the proposed action will result in a trend towards Federal listing of any sensitive wildlife species, or if the proposed action will affect wildlife species listed under the Endangered Species Act.

II. Description of the Proposed Project

Location: The Flat Country project area encompasses 74,063 acres. and is located east of Highway 126 near the community of McKenzie Bridge, Oregon.

The project area is within Boulder, Kink, and Lost Creek subwatersheds (6th field) of the McKenzie River (5th field). Proposed units are in Lane County: T.15S., R.6E., Sections 24, 25 & 36; T.15S., R.7E., Sections 19 through 22, 27 through 34; T.16S., R.6E., Sections 1, 11, 12, 13 & 14 T.16S., R.7E., Sections 1 through 11, 14 through 19, as well as Linn County: T.14S., R.7E., Sections 33 & 34; T.15S., R.6E., Section 12 & 13; T.15S., R.7E., Sections 3 through 7, 15 through 18. The project area is located in T18S, R4E Sections 1-6, 8-15 and 22-24; T18S, R5E Sections 6, 18; and T17S, R5E Section 31; Lane County, Oregon. Unit elevations range from 1800-4700'.

Proposed Action

The proposed project is needed to ensure the Willamette National Forest continues to supply a reliable supply of timber products and in doing so contributes to the stability of local, regional, and national economies and contribute towards the annual Probable Sale Quantity (PSQ) target of the Forest.

To accomplish this project, the district proposes to harvest about 102 million board feet (MMBF) from 108 stands ranging in age from 30 to 150 years old. Proposed harvest treatments include thinning, gap creation, dominant tree release, regeneration harvest, and skips. Meadow enhancement will include some removal of trees, which may be followed by piling and burning those piles, and seeding with natives. Post-harvest fuels treatments will include pile and burn and post-harvest underburn. Transportation related activities will include temporary road construction, road maintenance, road decommissioning, road storage. About 2,035 acres of roadsized hazardous fuels treatments are planned which would remove the understory up to 10" in diameter. Proposed harvest units will be yarded with ground-based systems, with the exception of helicopter use in portions of units 1350, 1870, and 1880.



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**Table 1. Summary of Forest Age Classes and Treatment Acres – Alternative 2.**

	Stem Exclusion (<80 years old)	Understory Re-Initiation (80-120 years old)	Mature (120-150 years old)	Mature and Old Growth (>180 years old)
Project Area¹ (74,063 acres)	19,997 (27%)	30,366 (41%)		26,663 (36%)
Acres of Harvest Units (including skips)	1,301	923	2,213	0
Acres Proposed for Harvest	1,129	608	1,602	0
Average Stand Age	41	108	138	NA

¹: Does not include non-forest areas such as meadows, and rock outcrops.**Table 2. Bunchgrass Meadow Restoration Treatments – Alternative 2**

	Stem Exclusion (<80 years old)	Understory Re-Initiation (80-120 years old)	Mature (120-150 years old)	Mature and Old Growth (>180 years old)
Acres Proposed for Tree Cutting (Commercial and Non-Commercial)	0	0	149 ¹	0

¹Bunchgrass Meadow treatments would include about 48 acres in mature forested stands, and about 101 acres in meadows, where trees are scattered and range in size from non-commercial under 7" dbh to larger diameters up to 40".

Proposed and Sensitive Species Considered and Analyzed

The list of threatened, proposed and sensitive wildlife species on the Willamette National Forest is shown in Table 3. Table 4 displays whether suitable habitat for each species is present in the project area which was determined by field visits, professional judgment, and a review of the scientific literature. Table 4 also displays whether the species has been documented or is suspected to occur in the project area. Table 4 displays that one threatened and ten sensitive species are either known or suspected to occur, or have suitable habitat present, and are evaluated in more detail in this report. For the other species shown in Table 4, no impacts are expected to occur as a result of the proposed project. The effects of the project on the threatened northern spotted owl are further addressed in the programmatic Biological Assessment (BA) and consultation with USFWS, which resulted in a Biological Opinion.

Figure 1. Map of Flat Country Project Area and Proposed Units with Alternative 2.

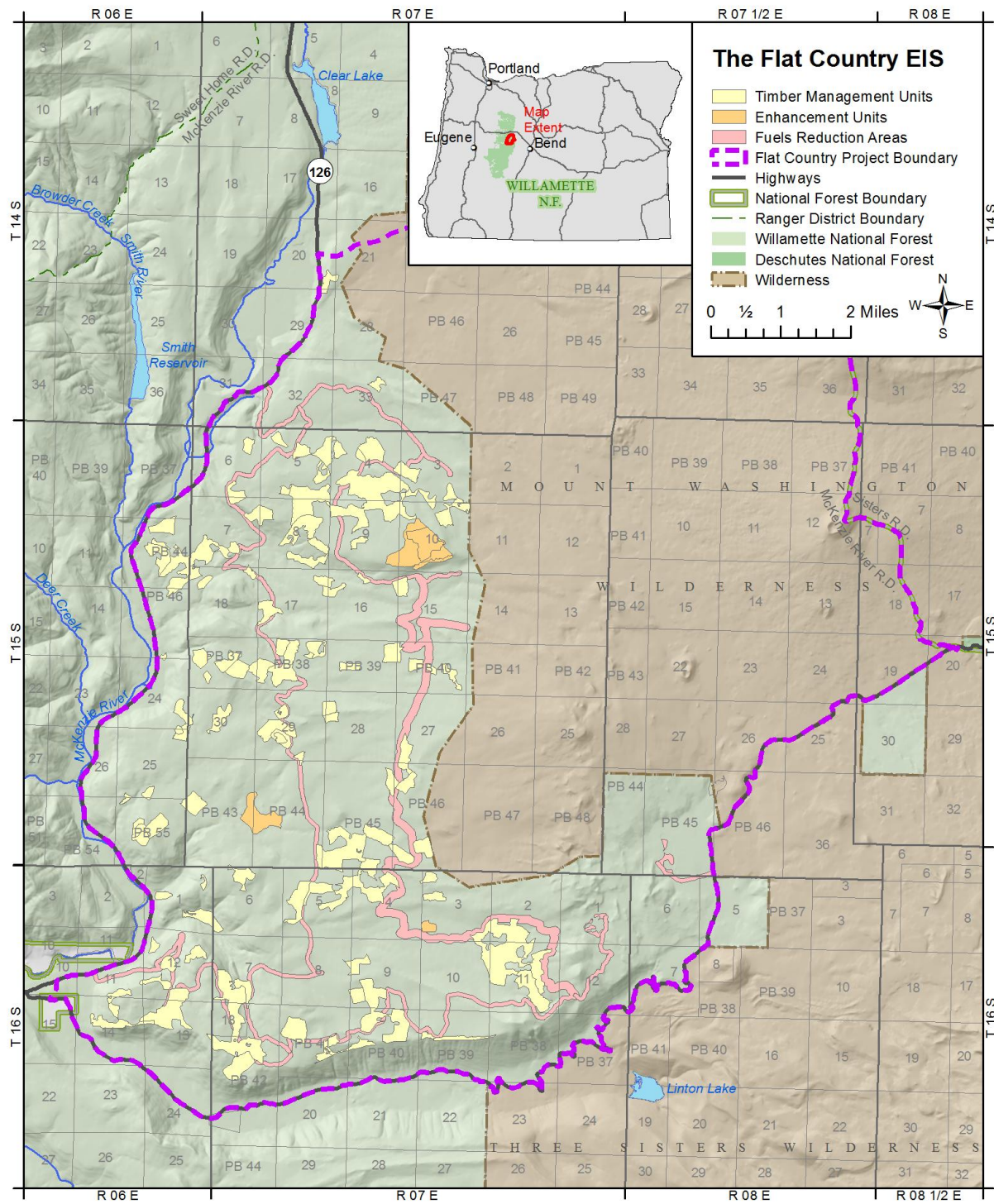


Table 3: Summary of Biological Background for Animal Species on the Regional Forester's Special Status Species List, Pacific Northwest Region, Willamette National Forest (July 21, 2015). This list may be found at <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/> under Region 6 Forest Service.

Species	Habitat
BIRDS	
Northern Spotted Owl <i>Strix occidentalis caurina</i> Status: Threatened	Occur primarily in the interior of older timber stands with structure required for food, cover, nest sites, and protection from weather and predation. Reproductive habitat = forest w/ canopy closure 60 – 80%; multi-layered, multi-species canopy dominated by large overstory trees (> 30" dbh); abundant large trees w/deformities (e.g. large cavities, broken tops, dwarf-mistletoe infections, decadence); abundant large snags/down logs; and sufficient open flying space below the canopy. Foraging habitat = forest w/ > 2 canopy layers; overstory trees > 21" DBH; abundant snags/down wood; and a 60-80% canopy closure. Dispersal habitat = forest w/ > 11" DBH trees and > 40% canopy closure. Numerous sightings and nests documented on the McKenzie River RD.
Bald Eagle <i>Haliaeetus leucocephalus</i> Status: Sensitive	Use scattered old-growth conifer trees in proximity to rivers, lakes, and reservoirs with plentiful prey. Feed primarily on fish, but will also eat waterfowl and carrion. On the McKenzie River RD, they currently nest at Clear Lake and Blue River Reservoir. There have been sightings at Trailbridge, Cougar, and Smith Reservoirs, Fish, Linton and Lost Lakes and along the McKenzie River.
American Peregrine Falcon <i>Falcon peregrinus anatum</i> Status: Sensitive	Preferred nesting sites are sheer cliffs 75 ft. or more in height. They forage within a variety of forest types. Numerous potential and occupied habitat occurs on the McKenzie River RD.
Bufflehead <i>Bucephala albeola</i> Status: Sensitive	Summers on wooded lakes and rivers, winters on lakes and coastal waters. Nesting normally occurs near lakes in tree cavities 5-50 feet high. Dives underwater and eats small mollusks, fish, snail, and crustaceans. Also eats aquatic insects. Appears to migrate through the McKenzie River Ranger District and may nest at high elevations in the wilderness (NRIS, accessed February 25, 2018).
Harlequin Duck <i>Histrionicus histrionicus</i> Status: Sensitive	During nesting (April-June) adults require fast-flowing water with loafing sites nearby, dense shrub or timber/shrub mosaic vegetation on the bank, and an absence of human disturbance. Nests are on ground under the shelter of vegetation, rocks, or large woody debris. Midstream loafing sites are very important. Broods prefer low gradient streams with adequate macro invertebrate abundance. Recorded breeding/foraging in tributaries to the McKenzie River and foraging in the McKenzie River. Harlequin ducks winter on the Pacific Ocean.
Lewis's Woodpecker <i>Melanerpes lewis</i> Status: Sensitive	There are limited records of Lewis' woodpecker on the Willamette National Forest and most of the observations have occurred outside of the breeding season and are most likely dispersing or migrating individuals. This woodpecker is associated with open forests, often at lower elevations. In Oregon it nests in white oak woodlands, ponderosa pine woodlands, mixed oak-pine woodlands, and cottonwood riparian woodlands. Lewis' woodpeckers are weak primary cavity nesters and most often secondary cavity nesters. In spring and summer, they eat mostly insects and spiders. In the fall, their diet turns to acorns and berries. They cache acorns under bark and

Species	Habitat
	in crevices of trees. Winters in oak savannah. Drastic decline in Oregon since the mid-1960s speculated to be from destruction of lowland oak habitat and competition with European starling. A regular transient in small numbers west of the Cascades, and most common in open habitats (e.g. burns) in and near Cascade forests.
White-headed Woodpecker <i>Picoides albolarvatus</i> Status: Sensitive	There are occasional reports of white-headed woodpeckers on the Willamette National Forest, mostly at high elevations along the Pacific Crest, adjacent to the east-side ponderosa pine forests. The species is mainly associated with ponderosa pine or ponderosa pine-mixed conifer forests; however sightings on the forest have occurred in habitat with lodgepole pine, western white pine, and Engelmann spruce. It requires large trees for foraging and snags for nesting. In spring and summer, it eats mostly insects, and in winter and early spring, it mainly feeds on seeds of ponderosa pine. Locally occurs west of the Cascade crest in upper reaches of the Umpqua River basin, in the Siskiyou Mtns., and in the north part of the east slope of the Cascades. No documented locations on the McKenzie River RD.
Purple Martin <i>Progne subis</i> Status: Sensitive	Nest in tree cavities, crevices in rocks, and artificial cavities located near open habitats such as savannah forestlands and meadows for foraging. They are often also associated with open water. They nest both singly and in colonies. Purple Martins eat mainly flying insects and lepidopteron species. They are known to occur in the Willamette Valley and Coast Range of Oregon; however there is a disjunct population in Southern Oregon and thus, occurrence is suspected on the Willamette National Forest. A long distance migrant that winters in South America. Breeds in the western Cascades. Western populations may be decreasing due to starling competition for nest sites. Occurs in the Upper Willamette and McKenzie watersheds but has not been documented on the McKenzie River RD.
Northern Waterthrush <i>Parkesia noveboracensis</i> Status: Sensitive	Northern waterthrush distribution is very limited in Oregon and is separate from other breeding populations. Typical habitat for the northern waterthrush is riparian thickets in forests, near rapidly flowing water. On occasion, it will use dense vegetation at the edges of lakes. They nest on the ground or in a hole in a stream bank. Their diet is mostly aquatic and includes terrestrial insects, spiders, mollusks, small fishes, and snails. Waterthrushes winter primarily in Mexico, Central America, and northern South America. There are a few records east of the Cascades. There is a small breeding population in riparian thickets along Crescent Creek and the Little Deschutes R., Klamath Co., and Salt Lake, Lane Co. The most recent sightings were in 2001 in Linn County.
Black Swift <i>Cypseloides niger</i> Status: Sensitive	Found near cliffs in mountainous regions. Feeds on-the-wing eating flying insects. Nests in small colonies on ledges or mountain crevices, often behind a waterfall. There are historical summer records in the Santiam Pass area, Linn County, which suggests breeding in that area. No current sightings on the McKenzie River RD, however there is a documented nest site on the Middle Fork RD.

Species	Habitat
MAMMALS	
Pallid Bat <i>Antrozous pallidus</i> Status: Sensitive	Pallid bats are usually associated with desert areas in Oregon; however they do occur in the drier interior valleys of west and southwestern Oregon. Occurrence has been documented in brushy/rocky terrain along the edges of conifer, deciduous and open farmland habitat. They would most likely occur at low elevations adjacent to the Willamette Valley (Lowell area). They are gregarious; living in colonies of 12-100 individuals. Day roosts are primarily in trees and rock crevices. Night roosts have been found in abandoned mines, rock overhangs/crevices, and deserted buildings. Little is known about winter hibernacula. They are insectivorous feeders. There has been no documentation of this species on the Willamette National Forest. Incidental locations have occurred historically west of Eugene.
Townsend's Big-eared Bat <i>Corynorhinus townsendii</i> Status: Sensitive	Although widely distributed throughout western Oregon, these bats are seldom abundant. They are characteristic dwellers of caves and abandoned mine tunnels, where they can be found at any season. They are moth specialists with over 90% of their diet composed of lepidopteron species. Only one maternity colony has been documented on the Willamette National Forest, on the Middle Fork Ranger District within an abandoned home. A few other locations exist on the Willamette National Forest and on the McKenzie River RD.
Pacific Fringe-tailed Bat, also referred to as Fringed Myotis <i>Myotis thysanodes</i> Status: Sensitive	Occurs in Oregon; however habitat use is poorly documented. Three captured in 1971 were associated with young coniferous forest. They are known to use caves, mines, rock crevices, and buildings as both day and night roosts. <i>Myotis thysanodes</i> likely migrates short distances to winter hibernacula that are lower in elevation and/or more southern than summer roosts.. Diet of moths, leafhoppers, lacewings, daddy-longlegs, crickets, flies, true bugs, and spiders. Occurrence has been documented on the McKenzie River RD.
Fisher <i>Pekania pennantia</i> Status: Sensitive	Found in a wide variety of densely forested habitats at low to mid-elevations. Diet consists of small and medium-sized forest mammals (porcupines, snowshoe hares, tree squirrels, mice, and voles most common). Also eat carrion, and will seasonally eat birds, bird eggs, amphibians, fish, and insects. Use ground burrows, tree cavities, witches'-brooms or other clumped growth, or occasionally bird or small mammal nests as resting sites. Tree cavities are used by most maternal females with young and ground burrows are used mostly in winter. Data suggests they do better in areas with minimized fragmentation of old growth, second-growth, riparian areas and in areas with abundant down and standing woody material important. There have been more than a dozen unconfirmed sightings of fisher on the forest over the years with a 2014 verified location on the Middle Fork Ranger District. Three documented sightings on the McKenzie River RD, however they have not been verified with DNA or a photo.

Species	Habitat
<p>Wolverine <i>Gulo gulo</i></p> <p>Status: Sensitive</p>	<p>Found primarily in wilderness or remote country where human activity is limited. High elevation areas appear to be preferred in summer, which may effectively separate wolverines and intensive human disturbance in most areas. In winter, wolverines move to lower elevations which are snowbound with very limited human activity. They do not significantly use young, dense stands of timber or clearcuts. The majority of activity occurs in large expanses of scattered mature timber, with some use of ecotonal areas such as small timber pockets, and rocky, broken areas of timbered benches. Heavy use of openings w/ good winter populations of big game, a principal source of carrion which makes up much of the wolverine's diet. They also feed on marmots, snowshoe hares, various rodents, insects, insect larvae, eggs, and berries. Rare documented sightings on the McKenzie River RD, mostly at higher elevations. Between 1965 and 1999, 33 mostly unconfirmed sightings or evidence of wolverine were reported on or adjacent to the Forest boundary. Aubry et al. (2007) report only a few sightings within the central Cascades prior to 1995.</p>
<p>Sierra Nevada Red Fox <i>Vulpes vulpes necator</i></p> <p>Status: Sensitive</p>	<p>Several known locations on the Willamette National Forest including the McKenzie River Ranger District along the Cascade Crest above ~4000'. Documented between Crater Lake and Mt. Hood, however may be only in widely distributed sky island populations that are not connected. Climate change poses potential direct and indirect threats to Sierra Nevada red fox. Because it inhabits high montane habitats, predicted warming trends are likely to significantly reduce the amount of montane boreal habitat available to the fox causing fragmentation and isolated islands of suitable habitat across its Oregon range. In addition, warming may allow non-native red fox and other potential competitors greater access to montane areas and could threaten the genetic integrity of the subspecies. Sierra Nevada red fox is one of three high-elevation montane subspecies referred to as mountain foxes (Aubry 1997, p. 55). Generally between June and November (Perrine 2005, p. 160), they prefer barren, high elevation habitats (Perrine 2005, p. 137) and use high-elevation shrub and conifer communities in proportion to their availability (Perrine 2005, p. 161). During the winter (generally November to June (Perrine 2005, p. 160)), they are associated with mature closed-canopy forest (Perrine 2005, p. 163) and preferentially select forested areas for travel, possibly to avoid deep snow (Benson et al. 2005, p. 128). The Sierra Nevada red fox demonstrates seasonal elevation migration, moving to lower elevations during the winter months (Perrine et al. 2010, p. 21), presumably to areas where prey are more readily available due to lower snow depths (Perrine 2005, p. 146). Sierra Nevada red fox, like other red fox in North America, appear to be opportunistic predators and foragers, with a diet primarily composed of small rodents (Perrine et al. 2010, p. 24).</p>
AMPHIBIANS	
<p>Foothill Yellow-legged Frog <i>Rana boylei</i></p> <p>Status: Sensitive</p>	<p>Live in sections of low-gradient streams with exposed bedrock or rock and gravel substrates. Attach eggs to the bottom of quiet scour-pools or riffles in gentle-gradient streams, often where there is only slight flow from the main river. Hatchlings cling to egg masses initially and then to rocks. Nearest known sightings on private land adjacent to the Sweet Home RD to the northwest, and there have been limited sightings in suitable habitat on the Middle Fork Ranger District within the Fall Creek Watershed. No documented habitat or sightings on the McKenzie River RD.</p>

Species	Habitat
Oregon Spotted Frog <i>Rana pretiosa</i> Status: Threatened	Favor lakes and slow moving streams associated with a permanent water source and a soft and muddy bottom. A marsh specialist with strong preference for warmer waters; more aquatic than other ranids; often found in water or water's edge floating on the surface or resting on aquatic vegetation. Diet is invertebrates caught above and below the surface. Early breeders: egg masses are typically deposited on top of one another in a communal fashion, not attached to vegetation, and deposited in warmer shallow water, making them susceptible to mortality due to freezing or drying. The only documented population on the McKenzie River RD occurs in and around Penn Lake in the Three Sisters Wilderness.
Pacific Pond turtle <i>Actinemys marmorata</i> Status: Sensitive	Inhabits marshes, sloughs, moderately deep ponds, slow moving portions of creeks and rivers. Observed in altered habitats including reservoirs, abandoned gravel pits, stock ponds, and sewage treatment plants. Occur from sea level to about 3,800 feet. Require basking sites, such as partially submerged logs, vegetation mats, rocks and mud banks, and may even climb a short way onto tree branches that dip into the water. They use uplands for egg laying, overwintering, and dispersal. They may move up to 500 meters and possibly more for overwintering where they burrow into leaf litter or soil. Nest distances from the water course ranges from 3 meters to over 402 meters. Most nesting areas are characterized by sparse vegetation, usually short grasses or forbs. Documented sightings on the McKenzie River RD are in lower elevation side-channels of the McKenzie River. There are larger populations on the Middle Fork RD to the south.
INVERTEBRATES	
Crater Lake Tightcoil <i>Pristiloma crateris</i> Status: Sensitive	Species may be found sparsely distributed throughout Oregon Cascades above 2000' elevation associated with perennially wet environment in mature conifer forests and meadows among vegetation or under rocks and woody debris. Suitable locations within 10 meters of open water generally in areas under snow for extended periods during winter. There is one documented site on the McKenzie River RD in the upper Hardy Creek drainage. Additional documented sites are on Mt Hood, Deschutes, Umpqua, Winema, and Rogue River National Forests.
Mardon Skipper <i>Polites mardon</i> Status: Sensitive	The mardon skipper is currently known to exist at seven, small, geographically disjunct areas in Washington, Oregon, and California. In the southern Washington Cascades, the mardon skipper is found in open, fescue grasslands within ponderosa pine savanna/woodland habitat at elevations ranging from 1,900 to 5,100 feet. South Cascade sites vary in size from small, ½-acre or smaller sized meadows, to large grassland complexes, and site conditions range from dry, open ridgetops, to areas associated with wetlands or riparian habitats. Within these environments a variety of nectar source plants are important. The short, open stature of native fescue bunchgrass stands allows mardon skippers to access nectar and oviposition plants. There are no known populations of this species on the Willamette National Forest. The USFWS latest review indicated this species occurs in the Puget Sound and southern Cascades area of Washington, in the Siskiyou Mountains of Oregon, and in isolated remnants on serpentine grasslands in Del Norte County, California. They generally occur in grassy openings in subalpine coniferous forests in mountain regions.


Species	Habitat
<p>Johnson's Hairstreak <i>Callophrys johnsoni</i></p> <p>Status: Sensitive</p>	<p>Johnson's hairstreaks are rare but have been documented on the Willamette National Forest. The current overall range is uncertain. It is considered to be very localized and scarce with a few "big" years. This butterfly depends on mostly old-growth coniferous forests that contain mistletoes of the genus <i>Arceuthobium</i>. The mistletoes occur mainly on western hemlock. Peak conditions for this butterfly exist in old-growth and late successional second-growth forests. Younger forests that contain dwarf mistletoe may also have the potential to support populations. Elevation ranges from sea level to 6,000 feet. This butterfly is typically located in the forest canopy.</p>
<p>Western Bumble Bee <i>Bombus occidentalis</i></p> <p>Status: Sensitive</p> 	<p>Bumblebees will visit a range of different plant species and are important generalist pollinators of a wide variety of flowering plants and crops (Goulson 2003 and Heinrich 2004). Although bumblebees do not rely on a single type of flower, some plants rely solely on bumblebees for pollination. Threats to bumblebees include: habitat alterations which could destroy or reduce the food supply produced by flowers, insecticides, invasive plants and insects, and global climate change. Several recently documented sightings on the McKenzie River Ranger District.</p>

Table 4. Presence and suitable habitat evaluation of Proposed, Threatened, Endangered, and Sensitive Wildlife Species for the Flat Country Project Area.

Threatened Species	Known or suspected present	Suitable Habitat Present? *(B, F, R, or D)	Rationale if not carried forward for analysis
Northern Spotted Owl <i>Strix occidentalis caurina</i>	Yes	Habitat present N, F, R, D	<u>Analyzed in detail in BE. Tiers to programmatic LAA Biological Assessment and U.S. Fish & Wildlife Service Biological Opinion</u>
Oregon Spotted Frog <i>Rana pretiosa</i>	No	No	No suitable lake habitat is present, nearest known population is about 16 miles south in the Three Sisters Wilderness.
Sensitive species	Known or suspected present	Suitable Habitat Present? *(B, F, R, or D)	Rationale if not carried forward for analysis
Bufflehead <i>Bucephala albeola</i>	No	Yes	Analyzed in detail in BE. High-elevation lake breeding habitat present in project area (Robinson and Kuitan Lakes and others in the wilderness) but not near proposed treatments
Black Swift <i>Cypseloides niger</i>	No	No	No suitable waterfall habitat present.
American Peregrine Falcon <i>Falco peregrinus anatum</i>	No	Yes	No suitable cliff nesting habitat present near proposed treatments. Potential nesting habitat on Mt. Washington.
Bald Eagle <i>Haliaeetus leucocephalus</i>	No	No	No lakes, fish, streams, or nest trees affected.
Harlequin Duck <i>Histrionicus histrionicus</i>	No	No	No suitable stream habitat is present in, or within disturbance distance of treatment areas.
Lewis's Woodpecker <i>Melanerpes lewis</i>	No	No	No ponderosa pine breeding habitat or lower elevation oak woodlands present, and no records of observations from the project area.
Northern Waterthrush <i>Parkesia noveboracensis</i>	No	Yes	No high-elevation willow habitat that would be modified near proposed treatments.
White-headed Woodpecker <i>Picoides albolarvatus</i>	No	No	No suitable habitat is present.
Purple Martin <i>Progne subis</i>	No	No	No suitable habitat is present.
Foothill Yellow-legged Frog <i>Rana boylei</i>	No	No	No suitable stream habitat is present.
Pacific Pond Turtle <i>Actinemys marmorata</i>	No	No	No suitable pond habitat is present. Lakes in project area would not be impacted and are higher elevation and poor quality habitat.
Crater Lake Tightcoil <i>Pristiloma arcticum crateris</i>	No	Yes	<u>Analyzed in detail in BE</u>
Western Bumble Bee <i>Bombus occidentalis</i>	No	Yes	<u>Analyzed in detail in BE.</u> BI due to small gap creation and roadside fuels treatments that may improve pollinator habitat
Johnson's Hairstreak	No	No	No suitable mistletoe habitat was seen in

<i>Callophrys johnsoni</i>			units during field review.
Mardon Skipper <i>Polites mardon</i>	No	Yes	<u>Analyzed in detail in BE</u> Meadow grassland habitat present in Bunchgrass Meadow.
Fisher <i>Pekania pennantia</i> (formerly <i>Martes pennanti</i>)	No	Potential habitat B, R, F, D	<u>Analyzed in detail in BE.</u>
Pallid Bat <i>Antrozous pallidus</i>	No	No	No suitable habitat is present.
Townsend's Big-eared Bat <i>Corynorhinus townsendii</i>	Yes	Yes	<u>Analyzed in detail in BE.</u>
Fringed Myotis <i>Myotis thysanodes</i>	Yes	Yes	<u>Analyzed in detail in BE.</u>
Wolverine <i>Gulo gulo</i>	No	No	No suitable habitat present.
Sierra Nevada Red Fox <i>Vulpes vulpes necator</i>	No	Yes	<u>Analyzed in detail in BE</u>

* B = breeding (nesting/denning) habitat, R = roosting/cover habitat, F = foraging habitat, D = dispersal habitat

III. Effects of the Proposed Action and Effects Determinations

The effects of Alternative 2 are the direct and indirect effects of the proposed logging, yarding, underburning, roadside fuels reduction treatments, meadow restoration, snag and downed log enhancement, temporary road construction, road decommissioning, and related project activities including noise disturbance as described on pages 1-3. No logging, roadside fuels treatments, or other actions would occur in Alternative 1 which would allow the stands to continue to develop into older forests unless altered by natural disturbances, such as wildfire which cannot be reasonably predicted to occur in these specific forest stands in the near future.

Northern Spotted Owl

Determination: *The Flat Country Project May Affect, and is Likely to Adversely Affect the northern spotted owl due to suitable and dispersal habitat removal and downgrading. Thinning of non-habitat and possible snag plus large down wood replacement and enhancement will benefit current and future habitat development.*

Brief Ecological Overview: The northern spotted owl is a species strongly associated with old-growth forests containing a component of large diameter Douglas-fir. These forest stands commonly provide a variety of structural features such as large diameter trees with large cavities, dense canopies with a high level of vertical and horizontal diversity, and abundant large snags and down logs (Thomas et al. 1990). Stands with all these characteristics provide the best suitable (nesting, roosting, foraging) habitat for spotted owls. However, all of the above characteristics may not need to be present for spotted owls to make use of an area as nesting, roosting or foraging habitat. The owl's affinity to old-growth forest types may result from adaptation and niche partitioning of this species to foraging on prey commonly present in such stands under lack of predation pressure and interspecies competition typical of more open areas (U.S. Fish and Wildlife Service 2011). Nevertheless, spotted owls have been known to forage short distances into harvested openings from a forested edge if prey is available (Courtney *et al.* 2004).



Northern Spotted Owl. Photo
Hernán Arias.

Suitable habitat consists of forested stands used by spotted owls for nesting, roosting and/or foraging. Features that support nesting and roosting typically include a moderate to high canopy closure (60-90%); a multi-layered, multi-species canopy with large overstory trees (with dbh greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly.

Northern Spotted Owls use mature and old-growth coniferous forest to forage (Forsman *et al.* 1984; Solis and Gutiérrez 1990; Carey *et al.* 1992). Their diet consists of small and medium-sized mammals, primarily rodents with Northern flying squirrels (*Glaucomys sabrinus*) and red tree voles (*Arborimus longicaudus*) being their principal source of food in the Western Cascades portion of their range (Thomas *et al.*, 1990; Wilson and Forsman, 2013). They tend to avoid crossing brushy and open forest areas and recently logged forests, although they may hunt along the edges of such habitats (Ward 1990).

Nest site selection occurs before egg-laying in March-April (Forsman *et al.* 1984). Young owls are totally independent by late summer and disperse from natal areas in September-October, after reaching adult weight (Gutiérrez *et al.* 1985; Miller 1989).

The northern spotted owl is a federally threatened species under the Endangered Species Act (ESA) that uses forest habitat in the project area. The effects of the various proposed actions for the Flat Country Project are addressed by the Willamette Planning Province Level I Terrestrial Team (2019) and were evaluated by the U. S. Fish and Wildlife Service (USFWS) in a Biological Opinion, which is also considering the 2012 Critical Habitat Rule. This BO fulfills the Forest Service's legal requirement with respect to Section 7 of the ESA for the Flat Country Project. This EIS tiers to this BO, as well as the Biological Assessment. A summary of the effects of the alternatives on the northern spotted owl is provided in this section.

Consultation on the northern spotted owl was based on current survey information provided by the H J Andrews Spotted Owl Demographic Study Area (Forsman *et al.* 2011), past district wildlife survey data, and an evaluation of any possible new owl sites based on unoccupied habitat. A total of twenty-one historic and currently occupied owl sites were consulted on and occur in the vicinity of the proposed harvest units (U.S. Fish and Wildlife Service 2019).

Interspecies Competition: The barred owl occurs throughout the Willamette National Forest. Competition with barred owls has been found to be an important threat to northern spotted owls (Dugger 2015). In western Oregon, both species prefer forests older than 120 years of age and the larger and more aggressive barred owls can displace spotted owls where they establish territories (Wiens 2012). Wiens (2012) has recommended retaining conifer forests older than 120 years of age as a method to reduce interspecific competition between the owl species. Where barred owls occur, he has found that spotted owl survival significantly declines as the percent of forests >120 years of age in the general home range drops below 35 percent.

Northern spotted owl habitat is classified as:

Suitable habitat that provides for nesting, roosting, and/or foraging. United States Fish and Wildlife (2012) describes it as, "...forested stands used by spotted owls for nesting, roosting and foraging. Features that support nesting and roosting typically include a moderate to high canopy closure (60-90%); a multi-layered, multi-species canopy with large overstory trees (with dbh of greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections,

and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly. This habitat is described as nesting and roosting habitat in the revised northern spotted owl recovery plan (USFWS 2011, p. A-10).” Suitable habitat can also function as dispersal habitat as it supports both territorial and dispersing spotted owls. Those units for the Flat Country Project which were considered to be suitable spotted owl habitat provide for foraging and roosting with marginal potential for nesting due to the relatively young growth form of the upper canopy and the lack of legacy trees over 250 years old.

Dispersal-only habitat provides for protection from avian predators and at least minimal foraging opportunities during dispersal and colonization periods. Dispersal habitat consists of, at a minimum, stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities (USFWS, 2011c, p. A-10). It is comprised of conifer and mixed mature conifer-hardwood habitats with a canopy cover greater than or equal to 40 percent and conifer trees greater than or equal to 11 inches average diameter at breast height (dbh) with open space beneath the canopy to allow spotted owls to fly. Generally, spotted owls use younger stands to move between blocks of suitable habitat, and to roost, forage and survive until they can establish a nest territory. Juvenile owls also use dispersal habitat to move from natal areas. Dispersal habitat thus includes habitat that will provide some roosting and foraging opportunities during the colonization phase of dispersal, but not at a scale that would support nesting pairs (Willamette Planning Province Terrestrial Level I Team 2012). While dispersal habitat is often referred to in a general sense as stands that are 40-79 years old, growing site conditions, tree spacing, elevation, stand size and landscape juxtaposition, precommercial thinning history, and stand structure, all play a role in the habitat a stand may provide at a particular age after harvest or other disturbance event. Field reviews for the Flat Country Project Area showed some stands less than 40 years old providing dispersal habitat conditions (i.e. unit 50), and others over 80 years of age that are judged to provide dispersal habitat rather than suitable habitat (i.e. units 190, 1310).

Non-habitat refers to land which is capable of growing habitat, but does not currently function as either suitable or dispersal habitat. There are some stands over 40 years of age that are still non-habitat because the trees are judged to be too dense for spotted owls to fly through (i.e. unit 1360).

The Flat Country units contain a mix of forest stand age classes and were classified into non-habitat, dispersal, and suitable spotted owl habitat based on aerial photos, followed by field reviews conducted in 2017 and 2018. The owl habitat mapping estimates there are currently about 19,123 acres of suitable habitat (26%), 8,683 acres of dispersal habitat (12%), and 46,229 acres of non-habitat (62%) in the Flat Country Project Area (Table 5).

Table 5. Current Amount of Spotted Owl Habitat in the Flat Country Project Area

	Suitable Habitat	Dispersal Habitat	Non-Habitat¹	Total
Acres	19,123	8,683	46,229	74,063
(% of project area)	(26%)	(12%)	(62%)	(100%)

¹ Some of the non-habitat acres do not have potential to function as spotted owl habitat, such as lava flows, large rock outcrops, or lakes.

The following documents contain a more comprehensive account of the biology, ecology, and status of the northern spotted owl: A Conservation Strategy for the Northern Spotted Owl (Thomas et al. 1990); Revised Recovery Plan for the Northern Spotted Owl (U.S.D.I. Fish and Wildlife Service 2011); Population Demography of Northern Spotted Owls, 1985-2008 (Forsman 2011); and Scientific Evaluation of the Status of the Northern Spotted Owl - SEI Report (Courtney et al. 2004).

Pre-field and Field Review: All Flat Country units were field reviewed between 2017 and October 17, 2018.

Recovery Action 32 (RA32) of the 2011 Revised Recovery Plan for the northern spotted owl identified a need to maintain older, more structurally complex multi-layered conifer forests containing large diameter trees, high amounts of canopy cover, and decadence components such as broken topped trees, mistletoe, large snags, and fallen trees (U.S. Fish and Wildlife Service 2011). Guidance for identifying such stands has been developed for the Willamette National Forest with review by USFWS and Bureau of Land Management (Doerr 2012). Field reviews by the wildlife biologist of all proposed treatment stands in 2017 and 2018 resulted in a delineation of 65 acres of RA32 habitat which resulted in those high-quality areas being dropped from harvest treatments. Additional RA32 habitat will be excluded from the roadside hazardous fuels reduction treatments. The effects of yarding through RA32 habitat are expected to be minor. Building or reconstructing temporary spur roads and landings in RA32 habitat is not planned and expected to be uncommon, if it is determined to be necessary during sale layout. It is not expected that any of these minor changes to RA32 habitat patches would adversely affect those patches.

Direct and Indirect Effects: The effects of the Flat Country Project on the Northern Spotted Owl were assessed at the following four scales:

1. Effects to Spotted Owl Habitat
2. Effects to Known Owl Sites
3. Effects to Critical Habitat
4. Effects due to Disruption

The effects of implementing this project on the Northern Spotted owl are May Affect, Not Likely to Adversely Affect for Habitat Modification, and May Affect, Not Likely to Adversely Affect for Disturbance (Table 6). Refer to the Biological Assessment and Biological Opinion for further information beyond what is described below.

Table 6. Flat Country Project Summary of Effects to the Northern Spotted Owl

Project Effects	Effects to the Northern Spotted Owl
Spotted Owl Habitat Modification	<i>May Affect, Likely to Adversely Affect</i>
Effects to Critical Habitat	<i>May Affect, Likely to Adversely Affect</i>
Effects to RA32 Habitat	No
Habitat Modification within 300m nest patches?	No
Habitat Modification within 0.5 mile nest cores?	Yes
Habitat Modification within 1.2 mile	Yes

home ranges?	
Incidental Take?	Not reasonably certain to occur, because occupied territories would not be impaired and no disruption to territorial spotted owls would occur.
Noise Disturbance?	<i>May Affect, Not Likely to Adversely Affect with recommended seasonal restrictions March 1-July 15 for occupied nest patches</i>

1. Effects to Northern Spotted Owl Habitat

Alternative 1 – No Action

Alternative 1 would have no effect on spotted owls or their habitat. Non-habitat plantations would slowly develop into dispersal habitat within another 10-15 years as the stands thin themselves. Those stands which are currently dispersal habitat would develop into low quality foraging habitat with limited nesting opportunity within 40-50 years. The stands which are currently foraging habitat with some nesting opportunity would develop towards old growth conditions and start to become high quality owl suitable habitat fitting the Recovery Action 32 stand characteristics in about 50-100 years.

Alternative 2

Alternative 2 would treat a mix of age classes with various treatments types to meet the purpose and need of the Flat Country Project. Table 7 displays Alternative 2 by age class, treated acres, and type of treatment. It is important to note that more acres are being analyzed for modification and removal than actual acres proposed for these treatments because “non-treated” areas in units such as skips and untreated areas of Riparian Reserves are included. Thus, it is likely the effects on owls would be lessened by these “untouched areas” although this is somewhat dependent as to where they lay on the landscape and how they connect to other habitat types.

Table 7. *Alternative 2 Age Class Acres by Harvest Treatment Type.*

Shelterwood with Reserves Age Classes	Actual Acres of Regeneration-Shelterwood
15-40 years	0
41-80 years	27
81-150 years	934
Total	961
Thinning Units Age Classes	Actual Acres of Treatment Thinning, Gaps and Dominant Tree Releases (includes skip acres)
15-40 years	884
41-80 years	401
81-150 years	1664
Total	2,949

About 430 acres of no-cut skips were included in the thinning acres above. Skip unit acres range from 1-43 acres in 91 units, as well as about 655 acres of no-cut skips in riparian reserves to benefit landscape diversity and provide patches of spotted owl suitable, dispersal and future habitat.

Table 8 below shows acres proposed for treatment by spotted owl habitat type.

Table 8. Alternative 2: Treated Acres by Spotted Owl Habitat Type (includes skips)

Spotted Owl Habitat Type(s)	Suitable	Dispersal	Non-habitat
Treated Acres	3,068 acres	456 acres	1,377 acres

Treatments in Suitable Habitat: Alternative 2 would remove about 2,556 acres, and downgrade about 487 acres, totaling about 16 percent of suitable owl habitat in the Flat Country Project Area (Table 5, 8), making the habitat unsuitable for spotted owls. Some of these stands just over 80 years of age are currently marginally suitable owl habitat, and those over 110 years of age are better quality habitat. In about 40 years post-harvest, these stands would develop into dispersal habitat. Retention of 25 large trees per acre would allow these stands to more rapidly develop into suitable habitat compared to what would occur in a regeneration harvest without leave tree retention. The regenerating stands would become suitable owl habitat and may achieve stand characteristics that fit the Recovery Action 32 description after 80 to 140 years, due to the retention of legacy trees that would exist in the stands at that time. This would especially be true if large snags and down wood are present.

Treatments in Dispersal Habitat: About 456 acres of dispersal habitat would be lightly to heavily thinned, which is about 5% of dispersal habitat in the Flat Country Project Area. Thinning that results in a post treatment canopy cover of under 40% would remove dispersal habitat. Units proposed for moderate thinning which maintain an average of approximately 40 percent canopy cover and are expected to close their canopies back to pre-harvest conditions within 7-10 years. This would allow recovery of flying squirrel habitat conditions, benefitting the preybase of spotted owls. Units with heavier thinning treatments and lower average canopy retention near 30 percent would need approximately 10-15 years to reclose their canopies back to pre-harvest conditions. No regeneration harvest treatments removing less than 26% canopy cover are being proposed. Thinning of dispersal habitat would benefit overall forest structural development and improve long-term spotted owl habitat conditions. If snags and down wood habitat conditions are enhanced post-harvest, stand structure would improve even more for spotted owls and their prey in the long-term.

Treatments in Non-Habitat: Approximately 1,377 acres, or approximately 3 percent, of forest stands that are currently non-habitat for spotted owls in the Flat Country Project Area would be thinned. This treatment would benefit spotted owls because forest structure would be improved over the current condition. Many of these forested stands characterized as “non-habitat” contain stand averages of trees with diameter breast heights of 11 inches, which is the lower size limit typically used to describe dispersal habitat. However, tree densities in these stands were judged to be too dense for owls to fly through, thus this habitat was determined to be non-habitat. Thinning of these stands would allow them to develop into dispersal habitat conditions faster than if they were left to develop naturally. Those stands which are currently too dense for owls to fly through and that would be thinned to leave an average 40 percent or denser canopy cover, would meet dispersal habitat conditions after thinning. This would improve this habitat in the near future and longer term. Structural enhancements such as snag and down wood placement would further benefit spotted owl habitat quality.

Because the harvest treatments are expected to increase diameter, crown radius, and crown ratio of individual trees, they are expected to improve the quality of dispersal and foraging habitat in the long

term and may be beneficial. Some of the created slash piles would be retained, which would benefit the woodrat prey base of spotted owls. There is also an opportunity to enhance snag and large down wood habitat if KV funding is available which would further improve habitat quality.

Gaps: About 322 acres within selected harvest units would have gaps ranging in size from 1-3 acres. The purpose of the gaps would be to increase the diversity of shrub and forage habitat. The gaps would regenerate to suitable foraging habitat in about 60 to 80 years.

Roadside Hazardous Fuels Reduction Treatments: Approximately 2,307 acres of fuels reduction treatment are planned with both Alternatives 2 and 3 (Table 9). These treatments would cut the understory up to 7" dbh on previously managed stands, and up to 10" dbh on older stands. The cut material would be either chipped, or piled and burned. Both RA32 habitat as well as known nest patches would be excluded from treatment. In addition, occupied nest patches would have a seasonal restriction during the critical nesting season from March 1-July 15. On about 11 miles, treatments would occur within 150 feet of road systems surrounding the Three Sisters Wilderness Area. On about 26 miles, treatments would occur on both sides of the road, with a 300-foot total treatment width. Some of the larger material may be sold as poles or firewood.

This treatment aims to provide pre-established strategic suppression/containment opportunities for wildfires burning within and adjacent to the Three Sisters Wilderness. It would reduce the abundance of ladder fuels within the road corridors and create a fuel profile more favorable to suppression efforts. Fire fighter and public risk would be reduced during wildfire suppression.

The proposed project is needed to create pre-established strategic suppression/containment opportunities along the Three Sisters Wilderness boundary and main access routes. If a wildfire became established beyond initial attack, the strategic suppression/containment areas would aid fire managers by giving more options to manage the fire with less risk to fire fighters and the public. Due to fire suppression over the past 100+ years, the forest has lost many of the mosaic characteristics from natural fire (variation of late/mid/early open and closed). With continuous ladder fuels (horizontal and vertical) throughout the project area, fire has the ability for high rates of spread, intensity and potential for spotting which creates greater risk for firefighters and the public. Fire may also spread into sensitive wildlife habitat areas such as active spotted owl 300 meter nest patches where the burning could adversely affect this species.

The proposed treatments would maintain the existing habitat at the stand level while degrading understory quality and foraging conditions. Given the large footprint of the fuels reduction activity, this activity is likely to adversely affect spotted owls. The effects of this project could last for 20-30 years until the understory vegetation including conifers up to 10" dbh reestablish. The understory vegetation removal treatments may increase the distance that the roadside edge intrudes into suitable and dispersal spotted owl habitat and thus would further reduce habitat quality somewhat. The roadside fire break may improve the ability to reduce wildfire spread and fire risks to spotted owl nest patches, nest cores, critical habitat and LSRs.

Four nest patches would be protected from treatments (2838, 2408, 2834, and 2829), as well as RA32 habitat. Two deficient nest cores in Critical Habitat (2408, 2838), but in currently unoccupied would also have suitable habitat acres excluded from treatments. In total, about 97 acres would be excluded from treatments.

Of eight known spotted owl core areas that overlap on the treatments, between about 8 to 80 acres (2% to 16%) of any core area have fuel treatments. Some of the understory is expected to grow back within about five years. While the treatments would reduce the effective habitat quality when suitable and dispersal habitat is treated, the functionality of owl home ranges would be maintained.

Although habitat functionality would be maintained, because the project would measurably degrade the understory foraging component of the suitable habitat at a cumulative level over substantial acres, the effects determination of fuels treatments is likely to adversely affect for general habitat modification and to Critical Habitat.

Table 9. Alternatives 2 and 3: Roadside Hazardous Fuels Reduction Treatments.

Spotted Owl Habitat Type(s)	Suitable	Dispersal	Non-habitat	Total
Treated Acres	841 acres	255 acres	1,211 acres	2,307 acres
Treated Acres in Critical Habitat Unit WCS3	15 acres	0 acres	159 acres	174 acres

2. Effects to Known Owl Sites

Effects of habitat modification on individual northern spotted owl sites are assessed at three spatial scales: the home range, core area, and nest patch.

Home Range – A home range in the Oregon Cascades Province is a 1.2 mile radius circle (2,955 acres) centered on an activity center (i.e. nest site). It is used by northern spotted owls to obtain cover and food, and for reproduction and rearing of young. Home ranges of multiple northern spotted owl pairs may overlap with habitat shared between adjacent resident northern spotted owl pairs and dispersing northern spotted owls. These areas are important for the survival and productivity as northern spotted owls are non-migratory.

Core Area – Within the home range, the core area (500 acres) is a 0.5 mile radius circle centered on the activity center, representing the area most heavily used during the nesting season (USDI USFWS et al. 2008). The core area is defended by territorial northern spotted owls and generally does not overlap the core areas of other northern spotted owl pairs.

Nest Patch – Within the core area, the nest patch (70 acres) is defined as a 300 meter radius circle around the activity center (USDI USFWS et al. 2008). The two key elements of habitat within a nest patch are: (1) canopy closure of dominant, co-dominant, and intermediate conifer and hardwood trees and (2) the amount of down wood (USDI USFWS et al. 2008). Modification of habitat within this area is considered likely to affect the reproductive success of nesting northern spotted owls and is used in determination of incidental take (USDI USFWS et al. 2008). There are no proposed units or hazardous fuels reduction activities that overlap nest patches.

The U.S. Fish and Wildlife Service (USFWS) have determined viability thresholds of 50 percent suitable habitat in the core area and 40 percent suitable habitat in the home range, respectively. Suitable habitat levels below these thresholds are thought to compromise the reproductive success of owls (USDI USFWS et al. 2008). Owls may successfully fledge young when suitable habitat drops below these percentages, but the likelihood of this decreases as suitable habitat declines.

Effects of Suitable Habitat Removed and Downgraded at Known NSO Sites:

Alternative 2 *may likely adversely affect* (LAA) nine sites, due to downgrading and/or removing suitable habitat within their core areas (Table 10). All but one of these sites are currently unoccupied, and they have been annually surveyed by the Oregon Cooperative Wildlife Research Unit since 1989. Sites 0826, 2828, 2421, and 2408 currently already have less than the 50 percent suitable habitat “viability threshold” in their core areas, and post treatment they would drop further below the “viability threshold” (Table 10). These four sites all meet the criteria of unoccupied, with annual surveys taking place since 1989, and no owl responses within the last five years. Because the sites are unoccupied, no take would occur. The low remaining amounts of suitable habitat within these nest cores would make future occupancy less likely.

Alternative 2 *may likely adversely affect* (LAA) sixteen sites, due to downgrading and/or removing suitable habitat within their home ranges (Table 11). Site 2827 is currently occupied, and would continue to meet the 40% “viability threshold” within the home range after harvest at 56% (Table 10). Site 2456 is currently unoccupied, and would continue to meet the 40% threshold at exactly 1182 acres of suitable habitat remaining after harvest. The remaining sites are not occupied, having been annually surveyed by the Oregon Cooperative Wildlife Research Unit since 1990. Four of these sites (0826, 2421, 2408, and 2834) do not currently meet the 40% suitable habitat threshold, and would lose additional suitable owl habitat, making their future occupancy less likely. Three sites (2827, 0825, and 0822) are occupied, and would have post-harvest habitat levels well above the 40% suitable habitat threshold, thus no take would occur.

One site of interest is 2834 which is located at about 4,700 feet elevation, and may possibly be one of the highest elevation spotted owl sites known. This site already has low levels of suitable habitat in both the core area as well as the home range. One of the reasons habitat levels are so low is that the higher elevation wilderness habitat to the east just outside the nest core is unsuitable. The large amount of proposed harvest and the shelterwood in unit 1810 are likely to make this owl territory even more suboptimal. Habitat quality within units 1810 and 1820 is poor to moderate quality suitable habitat, with some dispersal habitat as well. Unit 1810 would be thinned to a post-harvest canopy cover of about 29%, and unit 1820 would be thinned to about 36%. The higher canopy cover in unit 1820 is expected to develop into dispersal habitat with about 40% canopy cover in about five years. Snag and large down wood habitat mitigation would take place at the rate of 2/acre in unit 1810, and 4/acre in unit 1820, which would help improve future habitat conditions for the prey of spotted owls.

For the purposes of RA10 ranking, unoccupied status is achieved when there were at least five protocol survey years with a yearly site status of unoccupied within the last 10 calendar years, and this status occurred in the previous three consecutive calendar years. In the Flat Country project area, as of June 2020, there are 12 unoccupied, and 4 occupied sites. Because surveys have determined many historic owl sites to be unoccupied, take is not reasonably certain to occur until owls return. The more recent the year of occupancy is, the greater the risk that owls will return. In cases where owl territories would be impacted by harvest activities to the point where take may occur, the Forest Service will continue to survey these territories until the timber harvest is completed. Tables 10 and 11 below show the owl sites that will continue to require surveys due to proposed harvest impacts. These are owl sites where the take threshold would be exceeded, with suitable habitat in the nest core below 50%, or suitable habitat in the home range below 40%. Many of these owl sites will continue to be annually surveyed by the Oregon Cooperative Wildlife Research Unit as part of the owl demography study. The following six sites will need continued surveys: 0826, 2838, 2421, 2408, 1738, and 2834.

Table 10. Alternative 2: Treatments in Suitable Habitat in the Core Area (CA). Known sites requiring ongoing surveys are shaded.

Known Site	LUA ¹ of NSO site	Activity	Current Acres of Suitable Habitat in CA	% Suitable Habitat in CA	Suitable Acres Remove d/Downgraded	Functionality change	Acres Suitable Habitat after treatment	CA % Suitable after Treatment	Effect due to Habitat Modification	Occupied?	Harm ?
0826	LSR-100	Harvest Habitat Remove	156	31	1	Suitable Habitat Removed	155	31	LAA	No	No
2838	Matrix	Harvest Habitat Remove/Downgrade	242	48	29/1	Suitable Habitat Removed/Downgraded to Dispersal	212	42	LAA	No	No
2421	Matrix	Harvest Habitat Remove	201	40	92	Suitable Habitat Removed	109	22	LAA	No	No
2456	Congr. Reserved	Harvest Habitat Remove	274	55	3	Suitable Habitat Removed	271	54	LAA	No	No
2408	LSR-100	Harvest Habitat Downgrade	226	45	27	Suitable Habitat Downgraded to Dispersal	199	40	LAA	No	No
1738	LSR-100	Harvest Habitat Remove	299	60	52	Suitable Habitat Removed	247	49	LAA	No	No
2829	LSR-100	Harvest Habitat Downgrade	391	78	60	Suitable Habitat Downgraded to Dispersal	331	66	LAA	No	No
2834	Wilderness	Harvest Habitat Remove	248	50	29	Suitable Habitat Removed	219	44	LAA	No	No
2442	Adm. Withdrawn	Harvest Habitat Removal	300	60	22	Suitable Habitat Removed	278	55	LAA	Yes	No

¹ LUA=Land use allocation**Table 11. Alternative 2: Treatments in Suitable Habitat in the Home Range (HR). Known sites requiring ongoing surveys are shaded.**

Known Site	Activity	Current Acres of Suitable Habitat	Current percent Suitable in HR	Suitable Acres Remove d/Downgraded	Functionality change	Acres Suitable Habitat after treatment	percent HR Suitable after Treatment	Effect due to Habitat Modification	Occupied?	Harm ?
0826	Harvest Habitat Downgrade	844	29	8	Suitable Habitat Downgraded	836	28	LAA	No	No
2838	Harvest Habitat Remove/Downgrade	1637	55	105/133	Suitable Habitat Removed/Downgraded	1399	47	LAA	No	No

Known Site	Activity	Current Acres of Suitable Habitat	Current percent Suitable in HR	Suitable Acres Removed/ Downgraded	Functionality change	Acres Suitable Habitat after treatment	percent HR Suitable after Treatment	Effect due to Habitat Modification	Occupied?	Harm ?
					to Dispersal					
2421	Harvest Habitat Remove	1081	37	479	Suitable Habitat Removed	602	20	LAA	No	No
2456	Harvest Habitat Remove	1194	40	12	Suitable Habitat Removed	1182	40	LAA	No	No
2408	Harvest Habitat Remove Downgraded	1122	38	71/98	Suitable Habitat Removed/ Downgraded to Dispersal	953	32	LAA	No	No
1738	Harvest Habitat Remove Downgraded	1235	42	202/13	Suitable Habitat Removed/ Downgraded to Dispersal	1020	35	LAA	No	No
2409	Harvest Habitat Remove Downgraded	1703	58	72/10	Suitable Habitat Removed/ Downgraded to Dispersal	1621	55	LAA	No	No
2829	Harvest Habitat Remove Downgraded	1930	65	139/88	Suitable Habitat Removed/ Downgraded to Dispersal	1703	58	LAA	No	No
2827	Harvest Habitat Remove/ Downgraded	1811	61	116/49	Suitable Habitat Removed/ Downgraded to Dispersal	1645	56	LAA	Yes	No
2834	Harvest Habitat Remove	1050	36	198	Suitable Habitat Removed	852	29	LAA	No	No
2415	Harvest Habitat Remove	1328	45	10	Suitable Habitat Removed	1318	45	LAA	No	No
0829	Harvest Habitat Remove	1771	60	20	Suitable Habitat Removed	1751	59	LAA	No	No
0823	Harvest Habitat Remove	1619	55	27	Suitable Habitat	1592	54	LAA	No	No

Known Site	Activity	Current Acres of Suitable Habitat	Current percent Suitable in HR	Suitable Acres Removed/ Downgraded	Functionality change	Acres Suitable Habitat after treatment	percent HR Suitable after Treatment	Effect due to Habitat Modification	Occupied?	Harm ?
					Removed					
0825	Harvest Habitat Remove	1830	62	22	Suitable Habitat Removed	1820	62	LAA	Yes	No
0822	Harvest Habitat Downgrade	2125	72	20	Suitable Habitat Downgraded	2105	71	LAA	Yes	No
2442	Harvest Habitat Remove	1505	52	22	Suitable Habitat Removed	1483	51	LAA	Yes	No

3. Effects to Critical Habitat:

About 4,858 acres of the Flat Country Project Area are located in 2012 Critical Habitat Unit West Cascades South, subunit WCS 3, which is approximately 1,355,198 acres in size. The Flat Country project was planned at the broader landscape level, and it was determined that the overall project area is currently deficient in early seral habitats. This led to a project design of moving parts of the landscape towards the historic pattern and amounts. The critical habitat rule provides for “management actions within critical habitat that would restore or encourage early seral restoration where such habitat is underrepresented at the landscape ecosystem level and where the goal is to conserve landscape and biological diversity” (USFWS 2012 p. 269). The Critical Habitat Rule states that “It was determined that all of the unoccupied and likely occupied areas in the WCS3 subunit are essential for the conservation of the species to meet the recovery criterion that calls for the continued maintenance and recruitment of northern spotted owl habitat. The increase and enhancement of northern spotted owl habitat is necessary to provide for viable populations over the long term (USFWS 2012 p. 71926).”

The following summary of effects and discussion (Alternative 2) is specific to treatments which would occur in Northern Spotted Owl Critical Habitat Unit Cascades South, subunit WCS3.

All unit prescriptions would also retain small skip areas, thus the final average canopy cover would be slightly higher.

No RA32 habitat or nest patches will be treated, whether they are occupied or unoccupied. Yarding corridors may be placed within RA32 habitat, and those impacts are expected to be minor. Placement of landings and temporary spur roads will be avoided in RA32 habitat areas, and if these are needed this situation will be uncommon. Any trees felled in RA32 habitat will be left on the ground as down wood.

Treatments in Suitable Habitat within Critical Habitat: Thinning prescriptions were designed with an emphasis on retaining a post-harvest canopy cover of 40%, however some units will have a final canopy cover that is lower. The project proposes to downgrade about 496 acres by thinning suitable habitat down to 40% canopy cover, which would maintain dispersal habitat conditions. About 399 acres of suitable foraging habitat would be removed to a final canopy cover down to 36%, which is expected to recover to dispersal habitat conditions in less than 5 years. Downgrading and removing a total of 895 acres of suitable habitat *may affect, and is likely to adversely affect critical habitat.*

Treatments in Dispersal Habitat within Critical Habitat: About 123 acres of dispersal habitat would be thinned to a final canopy cover of 40%, continuing to function as dispersal habitat. Habitat would continue to function as dispersal habitat and thinning of these dense stands would accelerate the development of this dispersal habitat into suitable habitat.

About 186 acres of dispersal habitat would be removed and thinned more heavily, down to 33% canopy cover. Those stands are expected to recover to dispersal habitat within five years, and would benefit structurally with increased tree growth, more vertical and horizontal diversity, and some would have post-harvest snag and large down wood enhancement. Thinning a total of 309 acres of dispersal habitat *may affect, but is not likely to adversely affect critical habitat.*

Treatments in Non-Habitat within Critical Habitat: About 218 acres of non-habitat in eight stands would be thinned at post-harvest canopy covers ranging from 37-40%, with one unit at 27%. While the average diameter breast height size of these stands exceeds the minimum 11 inches that is the typical definition used to describe dispersal habitat requirements, these stands were judged to be too dense for owl movement or provide dispersal habitat function. Thinning treatments may accelerate the development of non-habitat conditions into dispersal and suitable habitat by thinning overstocked stands and/or providing additional structure to the stands. Because these stands are not currently functioning as spotted owl habitat, treatments may be beneficial, and thinning of these stands would improve habitat structure for spotted owls in the longer term after about 10 years. These prescriptions were designed to improve tree and canopy growth, and enhance diversity. Thinning these non-habitat acres *may affect, but is not likely to adversely affect critical habitat*, as the thinning would remove primary constituent elements of critical habitat i.e. trees.

Treatments of Known Sites within Critical Habitat:

The impacts of the proposed forest treatments which would downgrade or remove suitable habitat, on the nine known sites in the area of the proposed units within critical habitat were analyzed. Alternative 2 would downgrade 925 acres from suitable to dispersal habitat. This would reduce the amount of suitable habitat spotted owls would have in these home ranges to maintain their life functions and to provide for their reproductive capability. Additionally, these actions tend to fragment larger blocks of “continuous blocks of late-successional forest” (USFWS 2012, p.131).

While all proposed harvest treatments within Critical Habitat would maintain 40% or greater canopy cover, some of the owl sites shown below have home ranges that extend outside Critical Habitat and would have lower post-harvest canopy cover (Table 12).

Owl site 2838 is located within Critical Habitat and currently the suitable habitat within the core area is below the 50% threshold level at 48%. Four acres are proposed to be thinned to 33% canopy cover which would drop the suitable habitat in the core area to 212 acres or 42%. Acres within the home range are currently well above the 40% suitable habitat threshold at 55%, and would be reduced to 47%. This site has been annually surveyed with no responses and is currently unoccupied.

Owl site 2408 is located within Critical Habitat and has low suitable habitat levels within the core area at 226 acres or 45%. Thinning of unit 1340 would downgrade 27 acres to dispersal habitat and suitable habitat acres within the core area would drop to 199 or 40%. Home range suitable habitat acres are already deficient at 1122 acres or 38%, with a post-harvest condition of 32% suitable. This owl site has not had any responses with annual surveys since 2002, and is currently unoccupied.

Owl site 2409 would have suitable habitat acres removed within the home range only, but continue to remain well above the suitable habitat threshold at 55% post-harvest.

Owl site 2829 currently has suitable habitat levels in both the core area and home range well above the habitat thresholds at 78% and 65%, respectively. Post-harvest levels would be 66% in the core area and 58% in the home range. This owl site is currently unoccupied and has been annually surveyed since 1989 with a nesting pair in 1991.

Owl site 0829 is currently unoccupied and has current suitable habitat levels of 71% in the core area and 60% in the home range. Post-treatment levels would be 71% and 59%, respectively.

Owl site 0823 would have thinning and a shelterwood treatment in the home range, with post-harvest suitable habitat acres remaining at 54%. This site is currently unoccupied, with the last response a single in 2013. Surveys take place annually.

Owl site 0825 would have a shelterwood treatment within the home range resulting in a post-harvest suitable habitat level of 62%. This is an occupied site that last had a nesting pair in 2010, and a day resident single owl in 2014.

Owl site 0822 would have 22 acres of suitable habitat removed within the home range resulting in suitable habitat acres of 2105 post-harvest, or 71%. This site last had a nesting pair in 2010 and a single response in 2016, and is currently occupied.

Table 12. Alternative 2: Effects on Owl Sites (Habitat Changes) within Critical Habitat. While units within Critical Habitat will retain at least 40% canopy cover, some of the units within home ranges are outside of Critical Habitat and would retain a lower canopy cover.

Owl Site	Units/ Post Canopy Cover	Suitable habitat acres removed/ downgraded within 0.5 mile core area	0.5 mile core area suitable habitat acres/% suitable	0.5 mile core area suitable habitat acres post- harvest/% suitable	Suitable habitat acres removed/ downgraded within 1.2 mile home range radius	1.2 home range radius suitable habitat acres/% suitable	1.2 home range radius suitable habitat acres post- harvest/% suitable
2838	2111/33	4	242/48	212/42	42	1637/55	1399/47
	2112/33	25			25		
	1300/40	1			52		
	1260/40	0			14		
	1270/40	0			9		
	1280/40	0			40		
	1320/33	0			3		
	1310/33	0			11		
	1330/35	0			9		
	2190/30	0			25		
	2110/33	0			10		
	1040/40	0			18		
2408	1340/40	27	226/45	199/40	27	1122/38	953/32
	1300/40	0			5		
	2111/33	0			6		
	2120/26	0			2		
	2110/27	0			63		
	1210/40	0			5		
	2180/40	0			13		

Owl Site	Units/ Post Canopy Cover	Suitable habitat acres removed/ downgraded within 0.5 mile core area	0.5 mile core area suitable habitat acres/% suitable	0.5 mile core area suitable habitat acres post- harvest/% suitable	Suitable habitat acres removed/ downgraded within 1.2 mile home range radius	1.2 home range radius suitable habitat acres/% suitable	1.2 home range radius suitable habitat acres post- harvest/% suitable
	2170/40	0			43		
	1400/40	0			5		
2409	300/26	0	365/73	365/73	6	1703/58	1621/55
	350/36	0			38		
	1660/34	0			8		
	1680/36	0			20		
	1880/40	0			8		
	1900/40	0			2		
2829	1880/40	12	391/78	331/66	12	1930/65	1703/58
	1910/40	21			21		
	1900/40	27			27		
	350/36	0			4		
	1940/40	0			13		
	1920/40	0			15		
	1970/36	0			79		
	1980/32	0			56		
0829	1540/29	0	356/71	356/71	20	1771/60	1751/59
0823	1650/32	0	317/63	317/63	7	1619/55	1592/54
	300/26	0			10		
	1660/34	0			8		
	1680/36	0			2		
0825	10/22	0	290/58	290/58	22	1830/62	1820/62
0822	1260/40	0	430/86	430/86	20	2125/72	2105/71

4. Effects due to Disruption:

When logistically feasible, proposed activities are modified to avoid disrupting spotted owls. Activities may be moved beyond the disruption distance of known nest sites or predicted nest patches, conducted outside the disruption period or implemented during years when survey protocol determines that nest sites are unoccupied (USFWS 2012b).

The Flat Country project may use a Type 1 helicopter to log units 1350, 1870, and 1880. All of these units and their proposed landings are located well outside the disturbance distance of known owl sites, and no seasonal restrictions are needed.

Other ground-based Flat Country units were reviewed and due to many currently unoccupied owl sites, no seasonal restrictions for those units is needed at this time. This information may be updated if owl sites are determined to be occupied in future years before implementation. The Oregon Cooperative Wildlife Research Unit surveys much of the Flat Country Project Area each year which may result in future required seasonal restrictions.

If roadside hazard trees need to be cut during the nesting season near spotted owl nest sites, this work is expected to be short-term and may affect, but is not likely to adversely affect the northern spotted owl.

Alternative 3

Alternative 3 would have similar effects on forest structure and response as described in Alternative 2 for similar treatments. There is only one unit of suitable spotted owl habitat in Alternative 3, unit 2190 which was determined to be 75 years of age. This unit is low quality foraging habitat and contains a high density of large down wood, and a moderate density of snags. The proposed treatment would moderately thin the stand with a remaining post-harvest canopy cover of about 34%. This treatment would remove the habitat and recovery to dispersal habitat would be expected in about five years. The overall effects of Alternative 3 are much reduced, compared to those of Alternative 2. Table 13 below shows amount of acres proposed for treatment by spotted owl habitat type.

Thinning of 927 acres of non-habitat would improve habitat structure and improve the growth rate. Recommended snag and large down wood enhancement would furthermore benefit future habitat quality by improving conditions for the spotted owl prey base.

Table 13. Alternative 3: Treated Acres by Spotted Owl Habitat Type

Spotted Owl Habitat Type(s)	Suitable	Dispersal	Non-habitat
Treated Acres	75 acres	274 acres	927 acres

Cumulative Effects

The ongoing South Fork EA Cupola unit harvest would thin 51 acres of suitable foraging habitat. Other past actions in the Flat Country Project Area thinned non-habitat and dispersal habitat: Dulce CE (51 acres of non-habitat), Ollie CE (52 acres of dispersal habitat), Muskee CE (67 acres of dispersal habitat), Pass CE (34 acres of dispersal habitat), Norse CE (80 acres of dispersal habitat), and Roscoe EIS (2,438 acres of foraging, dispersal and non-habitat thinning). These projects included snag and large down wood treatments which improves stand structure and habitat conditions.

In considering direct, indirect, and cumulative effects, the project's proposed activities may affect and are likely to adversely affect northern spotted owls, but would not jeopardize the continued existence of the spotted owl. There are no other reasonably foreseeable or ongoing projects that would remove older forest habitat in the watershed. USFWS considered the effects of the Flat Country Project on interspecific competition between barred owls and spotted owls in determining that the Flat Country Project would not jeopardize the continued existence of spotted owls or adversely modify their critical habitat (USFWS 2012, p.37-39).

Similar to Alternative 2, considering direct, indirect, and cumulative effects, Alternative 3 may affect and is likely to adversely affect owls, but would not jeopardize the continued existence of the spotted owl. Both Alternatives 2 and 3 would not preclude meeting recovery goals for spotted owls and the landscape would still support owl dispersal post-treatment.

Design Criteria/Recommendations:

Deadwood levels, post-treatment, would meet Northwest Forest Plan standards and guidelines. Post-treatment, large (> 14" dbh) snags should be retained unless they pose a safety hazard.

High-density snag patches have been mapped in selected units and will be marked for retention skips. Additional such snag patches should be protected if found during sale layout.

Create additional snags and large down wood as shown in Table 16.

65 acres of RA32 habitat within units has been mapped and identified for retention.

Protect all potential nest trees which may be found in older stands and are generally >50" dbh, have broken tops, and large branches. Many such large nest trees within units that were not RA32 patches were GPSed and mapped for retention.

Communication with U.S. Fish and Wildlife Service: This project is consistent with current standards established for projects that could affect the northern spotted owl. These standards were established for the Willamette Province and are documented in the 2019 LAA Habitat Modification Biological Assessment (Willamette Planning Province 2019) and the subsequent Biological Opinion (U.S.D.I. Fish and Wildlife Service 2019). The action, as proposed, is not likely to jeopardize the continued existence of the spotted owl.

The following six sites will need continued surveys until harvest implementation to avoid take on an individual owl pair: 0826, 2838, 2421, 2408, 1738, and 2834.

Monitoring will ensure that actual levels of effects do not exceed the effects or incidental take levels anticipated by this assessment and its' associated Biological Opinion.

At the end of each calendar year, the administrative units will complete a project implementation and monitoring form to show actual levels of effect. This form should be forwarded to the FWS to fulfill the monitoring report requirements. Monitoring completes the regulatory requirements of the ESA by documenting actual effects to the subject species.

Bufflehead

Determination: No Impact.

Brief Ecological Overview: Summers on wooded lakes and rivers, winters on lakes and coastal waters. Typically nests at high-elevation forested lakes using cavities in trees close to water (Marshall et al. 2003). Nesting normally occurs near lakes in tree cavities 5-50 feet high. Bufflehead nest in cavities excavated by northern flickers and pileated woodpeckers. Appears to migrate through the McKenzie River Ranger District and nests at high elevations in the wilderness (NRIS, accessed May 25, 2019). Human disturbance from high recreation use and a shortage of suitable nesting cavities due to forestry practices may be having an impact on population status in Oregon (Marshall et al. 2003).



Female bufflehead. Photo by Audubon.org.

Field reconnaissance: There have been two summer bufflehead detections in the Flat Country project area at Patjens and Scott Lakes (NRIS, accessed May 25, 2019). Additional bufflehead observations have

occurred adjacent to the project area at Carmen and Trail Bridge Reservoirs. The Flat Country project area contains several lakes, primarily in the Mt. Washington Wilderness to the east, that provide suitable habitat for buffleheads. The most notable lakes are Robinson, Kuitan, Melakwa, Tenas, Benson and Scott Lakes. Summer 2017 through fall 2018 field reconnaissance of the Flat Country project area and Robinson Lake did not result in any additional detections of buffleheads and only very little time was spent around lake habitat.

Direct and Indirect Effects: There is one proposed Flat Country unit near Robinson Lake, however, it is over 650 feet away and thus, no impacts to the habitat of buffleheads would occur. The area surrounding Robinson Lake does contain some large trees and snags that may be used as nests for this cavity-nesting species. Any noise associated with harvesting the nearby units 1130 and 1140 is judged to be outside of the disturbance distance for buffleheads that may use Robinson Lake. While the proposed roadside fuels reduction treatments would include understory removal surrounding Melakwa and Scott Lakes, no large snags that may be used by nesting buffleheads would be removed. In addition, the Boy Scout Camp at Lake Melakwa and the high recreational use at Scott Lake make those areas less likely to be used as nesting habitat, compared to more secluded wilderness lakes where buffleheads with juveniles have been observed.

Design Criteria/Recommendations: Continue to survey the small lakes for buffleheads, especially during nesting season. Roadside fuels treatments would not cut any snags over 18" diameter so no lakeside nesting habitat near Lake Melakwa or Scott Lakes would be impacted.

American Peregrine Falcon

Determination: *While the project occurs in foraging habitat, no nest sites or potential sites within disturbance distance of the logging, meadow restoration, roadside fuels treatment or other proposed activities in the Flat Country project area are within noise disturbance distance, and no impacts to this species would occur.*

Brief Ecological Overview: Preferred nesting sites for peregrines are sheer cliffs 75 feet or more in height having horizontal ledges or small caves. Foraging is associated with a variety of open and forested habitats, however is most closely associated with riparian settings. Numerous potential nest sites and occupied territories occur on the Willamette National Forest.

Pre-field Review/Field Reconnaissance: There are two known nest sites within the project area, and one is directly adjacent.

Direct and Indirect Effects: Proposed harvest, meadow restoration and roadside fuels reduction activities may create some minor local changes in the peregrine falcon preybase. However, peregrine falcons have been observed feeding at large distances of ten or more miles from their nest sites, and thus, any changes to their preybase would have insignificant and immeasurable impacts. Noise disturbance from logging and fuels reduction activities within the primary and secondary nest zones may cause disturbance to breeding and nesting during the reproductive period.



Peregrine Falcon. Photo by Tom Kogut.

Design Criteria/Recommendations: Implement a seasonal operating restriction on noise disturbance activities from January 1-July 15 for treecutting, yarding, burning and wildlife tree creation in unit 490, and for the roadside fuels reduction treatments in the secondary nest zones along roads 2647 and 2649. These precise road locations may be obtained from the wildlife biologist and include about 0.7 miles on road 2647, and 1.3 miles on road 2649.

Northern Waterthrush

Determination: *This project would not modify potential Northern Waterthrush riparian habitat and thus, no impacts to this species would occur.*

Brief Ecological Overview: Preferred nesting sites for this species are in riparian thickets.

Pre-field Review/Field Reconnaissance: There are no known northern waterthrush locations within the project area, however, surveys have not been conducted. There is one aural location from 1990 at Lost Lake on the McKenzie River Ranger District, however one survey in 2010, and two protocol surveys in 2011 failed to detect any sightings. Additional observations have been documented from three locations on the Middle Fork Ranger District from 1990 to 2010.

Direct and Indirect Effects: The proposed Flat Country project would not alter riparian willow habitat that may be used by Northern Waterthrush, thus no impacts to this species would occur.

Design Criteria/Recommendations: Continue to document any additional sightings.



Crater Lake Tightcoil

Determination: *For harvest units and roadside fuels reduction treatments, there will be no treatment within 10 meters of perennial wet areas, and there should be no impact on this mollusk.*

Brief Ecological Overview: The Crater Lake Tightcoil may be found sparsely distributed throughout the Oregon Cascades above 2,000' elevation associated with perennially wet environments in mature conifer forests and meadows among mosses and other vegetation, on logs, attached to decaying leaf surfaces, in litter, inside other shells, or under rocks and woody debris. Suitable locations are within 10 meters of open water and are generally in areas under snow for extended periods during winter (BLM 1999). Essential habitat components include uncompacted soil, litter, logs, and other woody debris in a perennially wet environment (Duncan 2004).



Crater Lake Tightcoil. Photo taken by Evergreen State College.

This species is among many organisms functioning as primary and secondary consumers that contribute to soil building and dissemination of spores and microbes. Having very limited dispersal capabilities on their own, they may be assisted in dispersal by other vectors capable of transporting mud that may

contain eggs or adults across distances into suitable habitat (Duncan et al. 2003). An example of such dispersal could be individuals in mud transported on the hoof of a deer or elk.

Loss or degradation of suitable wetland habitat has been identified as the major threat to this species.

Status Background: The Crater Lake Tightcoil had been listed as a Survey and Manage species since the 1994 Northwest Forest Plan ROD (USDA, USDI 1994). Under the 2001 ROD (USDA, USDI 2001) it was classified as a Category B species. This requires pre-disturbance surveys if habitat will be impacted, and management of all known sites. The Crater Lake Tightcoil was added to the Regional Forester's sensitive animal list in July 2004.

Pre-field Review/ Field Reconnaissance: There are no known Crater Lake Tightcoil locations in the Flat Country Project area, but not many formal surveys for this species have been conducted. Surveys for Crater Lake Tightcoils were not conducted in the Flat Country Project Area because all wet areas would be protected with a 10 m buffer, which in many cases is much greater up to 180 feet as recommended by the hydrologist and fisheries biologists.

There is only one documented site of the Crater Lake Tightcoil on the Willamette National Forest in the Hardy Creek drainage of the McKenzie River Ranger District which is about 16 miles to the southwest of the Flat Country project area. This site was found on 10/24/2005 (NRIS database accessed February 2018).

As of August 2005, specimens had been confirmed at approximately 160 sites based on limited surveys (Duncan 2004, NatureServe 2009). Based on habitat described in an established survey protocol for this species (Duncan et al. 2003), a moderate amount of suitable habitat for Crater Lake Tightcoil does exist across the Flat Country project area above 2000 feet near riparian areas.

Direct and Indirect Effects: For all proposed Flat Country Project units and the roadside fuels reduction treatments, there will be no treatment within 10 meters of perennial wet areas, and thus there should be no impact on this mollusk. For this reason, the persistence of the species if present in the proposed units should not be compromised by the tree cutting and other associated operations. Because measures will be taken to protect suitable habitat for this species against disturbance or modification from effects associated with the proposed activities, there are no recognized direct or indirect effects to this species or its' habitat from the proposed activities in project units.

Cumulative Effects: Measures have been taken on all past projects since at least 1994 when the Northwest Forest Plan was first implemented to protect suitable habitat for this species against disturbance or modification from effects associated with the proposed activities. Thus, there are no recognized direct, indirect, or cumulative effects to this species or its' habitat from the proposed activities, and no impacts to overall population viability.

Design Criteria: There is a project-specific design criteria prohibiting work within 10 meters of perennially wet areas to protect habitat for the Crater Lake Tightcoil.

Recommendations: Ensure that measures identified to prevent habitat disturbance within 10 meters of perennially wet areas are implemented during project activities.

Western Bumble Bee and Mardon Skipper

Determination: *The proposed Bunchgrass Meadow Restoration which is part of Flat Country will maintain and improve potential habitat in the long-term for these meadow species.*

Brief Ecological Overview: Western Bumble Bees have three basic habitat requirements: suitable nesting sites for the colonies, nectar and pollen from floral resources available throughout the duration of the colony period (spring, summer and fall), and suitable overwintering sites for the queens (Jepsen 2014). Nesting occurs underground primarily in rodent burrows. Bumble bees require plants that bloom and provide adequate nectar and pollen throughout the colony's life cycle, which is from early February to late November, although the actual dates likely vary by elevation.



Western Bumble Bee on Spiraea at Scott Lake, Flat Country Project Area. Photo by Rich Hatfield, Xerces Society.

Mardon skippers are grassland dependent and appear to have narrow habitat requirements, at least in some portions of their range. In Oregon the most nectaring was seen on varileaf cinquefoil (*Potentilla diversifolia*). Habitat loss or modification through conifer encroachment, noxious weed invasion, roadside maintenance, and grassland/meadow management activities such as prescribed burning and mowing are also threats (Kerwin et al. 2011).

Pre-field Review/Field Reconnaissance: There are seventeen documented locations of Western Bumble Bee in the Flat Country Project Area (NRIS database, accessed May 24, 2019). There are no documented observations Mardon Skipper in the Flat Country Project Area. Bunchgrass Meadow was surveyed twice in 2006, with no detections. It may provide suitable habitat.



Mardon Skipper. Photo by Tom Kogut, U.S. Forest Service.

Direct and Indirect Effects: The proposed restoration of the ~149-acre Bunchgrass Meadow to a more open meadow habitat with associated native pollinator seed collection and seeding will increase the availability of suitable habitat for pollinator insects including Western Bumble Bees. Mardon Skipper habitat may also potentially benefit, if they occur in the area. In addition, an additional 324 acres of gap creation in thinned stands, and 961 acres of shelterwoods may benefit understory flowering plants and native grasses that both of these species may use, although it would not be as long-lasting or as beneficial as native meadow habitat in general.

Design Criteria/Recommendations: Continue to maintain Bunchgrass Meadow in an open meadow habitat to benefit Western Bumble Bee and Mardon Skipper habitat. For Western Bumble Bee, protect known and potential sites from threats such as conifer encroachment that can interfere with the habitat requirements of this species (availability of nectar and pollen throughout the colony season and availability of underground nest sites and hibernacula). Native pollinator plant enhancement by seed collection and dispersal in additional suitable habitat may benefit Western Bumble Bees.



Fisher. Photo by Washington State Department of Fish and Wildlife.

Fisher

Determination: No Impact. *In the long-term, Fisher habitat quality may benefit from stand diversification and large down wood enhancement. Due to the fact that Fisher has not been documented to occur on the McKenzie River Ranger District, Alternative 2 is very unlikely to affect the Fisher. Alternative 2 would retain sufficient habitat to provide for fishers should they reestablish in the area in the future.*

Brief Ecological Overview: The Fisher is a mustelid species that historically occupied forests in western Oregon (Verts and Carraway 1998). Contrary to limited results from past studies, contemporary research indicates that fishers in the western United States are not dependent on old-growth conifer forests for survival (Raley et al. 2012). Instead, fishers are associated with complex vertical (e.g., large trees and snags) and horizontal (large logs and dense canopy) structures characteristic of late seral mixed conifer or conifer-hardwood forests in low to mid-elevations (op cit.). Fisher home ranges are characterized by a mosaic of forest types and seral stages, including high proportions of mid to late seral conditions and low proportions of open and nonforested areas. In the West Coast region, fisher home ranges average about 4,600 acres for females and 13,000 for males (Lofroth et al. 2010).

This species inhabits widespread, continuous-canopy forests at relatively low elevations, and is most abundant in mountainous regions. It is less abundant in foothill regions. Fishers occupy a wide variety of densely forested habitats at low to mid-elevations (330-5900 feet/100-1800m). Typical habitats include western hemlock (54 percent), subalpine Pacific fir (26 percent), and Sitka spruce (20 percent). Fishers were documented to use primarily live trees, snags, stumps, logs, rock crevices and ledges, and fox dens for rest sites (Raley et al. 2012 p.191).

Habitat for Fishers can be enhanced by minimizing forest fragmentation, both in remaining old growth and second growth; maintaining a high degree of forest floor structural diversity in intensively managed plantations; preserving large snags and live trees with dead tops; maintaining continuous canopies in riparian areas; and protecting swamps and other forest wetlands (Aubry and Lewis 2003).

Pre-field review: It is unknown if this species occurs on the McKenzie River Ranger District. Until a camera station detected a fisher on the Middle Fork Ranger District in January 2014, this species had not been verified on the Willamette National Forest. There have been three fisher sightings on the McKenzie River Ranger District which appear to be valid, but none have collected photographic or DNA evidence. A limited amount of camera station work has been accomplished since that time on the McKenzie River Ranger District during the winters of 2014 and 2015, however no fishers have been detected.

Field reconnaissance: Habitat for Fishers in the Flat Country Project Area is judged to be of low to moderate quality. About 31% of the Project Area has stands that are over 250 years of age (Table 1) which would provide the highest quality habitat. Mid-quality fisher habitat would be expected in stands between 81-249 years of age which makes up about 46% of the Flat Country Project Area. Areas of

previously managed plantations which provide low levels of forest structural diversity are of low habitat quality and make up about 27% of the Flat Country Project Area.

Snag abundance within the Flat Country proposed units is moderate in about half of the stands, and low in the other half, most especially in stands under 80 years of age (Table 14).

Down wood abundance is generally higher, with many plantations showing relatively high levels of large down wood that was left from the original harvest around 40 years ago. While much of this down wood is older and Class 4-5, the large diameters of much of it over 40" would make it last for many more decades (Table 15).

Table 14. 2017-2018 snag field surveys of the proposed Flat Country harvest units showed the following visual estimates of snag habitat over 14" diameter. Percentages are based on weighted unit acres.

	High (>6 trees/acre)	Moderate (3-6 trees/acre)	Low (<3 trees/acre)	None
121 Flat Country units	4%	46%	30%	19%

Table 15. 2017-2018 down wood field surveys of the proposed Flat Country harvest units showed the following visual estimates of down wood over 14" diameter. Percentages are based on weighted unit acres.

	High (>6 trees/acre)	Moderate (3-6 trees/acre)	Low (<3 trees/acre)	None
121 Flat Country units	36%	45%	17%	2%

Direct and Indirect Effects: Due to the fact that Fisher has not credibly been documented to occur on the McKenzie River Ranger District, Alternative 2 is very unlikely to affect the Fisher, yet some potential Fisher habitat may be affected.

Under the no action Alternative 1, current road closures of about 39% of the ~192 miles of roads in the Flat Country Project Area would continue to provide a degree of seclusion for fishers, if they occur in the area. Road closures consist of gates, berms, decommissioning, and in some cases vegetation that has grown in making the roads undrivable. Young stands would continue to develop on their current trajectory towards late successional forests and eventually provide more diverse forest structures preferred by this species.

Alternative 2 of the Flat Country Project includes 1863 acres of harvesting stands over 80 years old, some of which are up to 150 years old. An additional 90 acres would be cut and removed as part of the Bunchgrass Meadow Restoration Project (Table 1). The older stands contain higher quality potential habitat for the fisher. Alternative 1 would not affect these stands, which, barring high-intensity fire or other large scale disturbance, would continue to develop forest structure that includes tree cavities for resting and natal dens that would benefit fisher if they occurred in the watershed. Shelterwood harvest proposed in Alternative 2 would degrade fisher habitat by reducing future snag and downed wood sources and by reducing forest canopy that could aid in thermoregulation (Raley et al. 2012). Thinning that leaves a higher canopy cover would impact habitat conditions less. Post-treatment canopy cover would range from 9-46 percent, and a post-treatment weighted canopy cover average of 26-72 percent. Stands with a higher post-harvest canopy cover would have more forest structure of value to fishers.

The remaining overstory trees, combined the management recommendation to leave and/or create large down wood (EA Design Criteria in Chapter 2) may ensure habitat requirements of this species are met, and will provide long-term potential future habitat benefits to Fishers, if they occur in the area.

Alternative 2 would impact about 5 to 24 percent of 4 hypothetical female fisher home ranges based on where units over 80 years of age are clustered within about 20,000 acres of the Flat Country Project Area. About 9 percent to 13 percent of 2 hypothetical male fisher home ranges may be impacted. The management recommendation to leave and/or create large down wood may ensure habitat requirements of this species are met. If the Fisher does occur in the project area, there could also be some impacts due to noise disturbance from the logging operation and associated work, which could cause temporary or longer term displacement.

Alternative 3 would not impact any stands over 80 years of age, and thus would be unlikely to have an impact on fisher other than potential noise disturbance from the logging operation if they were using adjacent older forested areas. This could cause temporary displacement, but this would be less noise disturbance than with Alternative 2 because there are reduced acres. The scale of proposed impacts is unlikely to preclude fisher from reestablishing in the Flat Country Project Area, yet is judged to show some possible impacts from noise disturbance if the species is currently present.

Thinning of the younger stands with subsequent down wood placement in Alternatives 2 and 3 may improve down wood habitat conditions and may thus provide a minor benefit to Fishers, if they occur in the area.

Both Alternatives 2 and 3 propose reductions in road system access. All of these road systems generally receive low use with the exception of the fall hunting season, so in total any impacts to Fisher from closing these road systems are judged to be minor. The following Table shows a summary of the roads management changes for Alternatives 2 and 3.

Road Activities Associated with Flat Country				
Proposed Activity	Unit of	Alternative 1	Alternative 2	Alternative 3
New Road Construction	Miles	0	0	0
Temporary Road Construction	Miles	0	15.5	6.7
Roads Maintained	Miles	0	108.2	56.2
Road Decommissioning	Miles	0	14.1	14.1
Road Storage	Miles	0	4.7	4.7

While the proposed temporary road construction, associated with all the other Flat Country activities would increase human and noise disturbance, these would be temporary impacts. In the longer term, the road decommissioning associated with Alternatives 2 and 3 would decrease human-associated traffic and enhance seclusion which would not only benefit fishers, but other wildlife species.

Additional impacts of the proposed Flat Country Project are about 2,305 acres of roadside hazardous fuels treatments which would cut, pile and burn the understory at a distance of 150 or 300 feet on each side of selected roads. Maximum cutting diameters would be 7" in plantations, and 10" in unmanaged older stands. The enlarged roadside openings would eliminate ground seclusion and brushiness in the short-term, resulting in poor habitat quality for fisher until the understory grows back, which may be

stimulated to grow faster with increased sunlight. If these treatments are repeated in the future, there would be a longer term reduction of down wood in the understory. Habitat quality would be reduced due to more disturbance (visually and noise) and a reduction in dispersal habitat.

Due to the scale of proposed impacts from Alternatives 2 and 3, it is my determination that Alternatives 2 and 3 may impact Fisher habitat quality in the short term (<10 years) due to disturbance from logging operations and associated work, as well as the roadside hazardous fuels treatments. This impact will not compromise the viability of the Fisher population across the Project Area. In the longer term (>10 years), with the successful year round road closures as described above and potential for large down wood creation, Alternatives 2 and 3 may benefit Fisher. Alternative 1, which would do nothing, would have no impact on Fisher.

Fisher is not likely to currently inhabit the Flat Country Project Area and thus, any effects to potential habitat are unlikely to occur. Due to the lack of any documented presence of the Fisher on the McKenzie River Ranger District, it is my determination that Alternative 2 would not impact this species. In the longer term (>10 years), with the potential for large down wood creation where it is currently scarce, Alternative 2 may benefit potential Fisher habitat. Alternative 1, which would do nothing, would have no impact on potential Fisher habitat.

Cumulative Effects: The scale of proposed impacts may adversely impact individuals due to possible noise disturbance, but would not result in a loss of viability in the Project Area, nor cause a trend toward federal listing. There may be long-term benefits to habitat due to year-round road closures and possible large down wood enhancement. The management recommendation to leave and/or create large down wood may ensure that habitat requirements of this species is met. For the Fisher considering direct, indirect, and cumulative effects, activities may impact individuals, but are expected to maintain viable populations within the Flat Country Project Area, 6th field watersheds and at the Forest-scale, and are not likely to result in a trend towards federal Endangered Species Act listing.

Considering this project as well as past, present, and reasonably certain future projects, over 41 percent of the Flat Country Project Area would remain in forest habitat greater than 150 years of age (EA Chapter 3, Forest and Stand Structure). Thus Alternative 2, considering direct, indirect, and cumulative effects, would retain sufficient habitat to provide for fishers should they reestablish in the area in the future. These older forest stands would continue to provide diverse forest habitat structures as potential high quality fisher habitat. Alternative 2 would retain sufficient habitat to provide for fishers should they reestablish in the area in the future.

Design Criteria/Recommendations: The management recommendation to leave and/or create large down wood (EA Design Criteria in Chapter 2) may ensure habitat requirements of this species are met, and would provide long-term potential future habitat benefits to Fishers, if they occur in the area.

Retain down log habitat as described in the prescription. Leave all currently existing large down woody material in the older decay class 3-5. Ensure that down wood in the area is maintained at a minimum level of 240 lineal feet/acre in full tree lengths. If it is not present after logging is completed, trees should be felled until the prescription has been met.

Implement road closures as planned, as soon as possible after logging is completed.

Continue to conduct camera and hair snare surveys for this rare species to determine if it exists on the McKenzie River Ranger District, and continue to explore the idea of a reintroduction.

Fringed Myotis and Townsend's Big-eared Bats

Determination: *Alternative 2 may adversely impact individuals, but would not likely result in a loss of viability in the Planning Area, nor cause a trend towards federal listing. Snag habitat enhancement may benefit these bat species.*

Brief Ecological Overview: These two bat species are known to roost in tree and snag cavities and under loose bark (Lacki et al 2007), although both species have typically been associated with caves and buildings (Verts and Carraway 1998). In the westside Cascades, snags are thought to be the main roosting habitat for fringed myotis and a minor roosting component for Townsend's big-eared bats (Ormsbee personal communication).



Pacific Fringe-tailed Bat, also named Fringed Myotis. USDA Forest Service photo.

Very little is known about fringed myotis habitat in Oregon. Occurrence has been documented scattered across the Willamette National Forest, and three were captured in 1971, associated with young coniferous forest. They are known to use caves, mines, rock crevices, buildings, and trees as both day and night roosts. Nothing is known about their habits in winter. Their diet consists of moths, leafhoppers, lacewings, daddy-longlegs, crickets, flies, true bugs, and spiders.

Fringed myotis likely migrates short distances to winter hibernacula that are lower in elevation and/or more southern than summer roosts (Keinath et al. 2004). Their diet in western Oregon consists primarily of moths (Lepidoptera), followed by spiders (Araneae) and harvestmen (Phalangida), beetles (Coleoptera), and flies (Diptera) (Whitaker et al. 1977).

Pre-field Review: All known roost sites for these bat species on the Willamette National Forest were found under bridges. There are a total of eight Townsend's Big-eared Bat locations on the McKenzie River Ranger District, and one from the westernmost portion of the Flat Country Project Area from 1992 (NRIS, accessed June 7, 2019). One winter hibernacula is known on the McKenzie River Ranger District which has had between six to a dozen individuals between 2009 and 2015 and is annually monitored (Doerr, personal communication 2015). Only one maternity colony has been documented on the Willamette National Forest, on the Middle Fork Ranger District within an abandoned home.

There is an overall lack of survey data and poorly documented habitat requirements and life-history accounts for the Fringed Myotis (Ormsbee pers. com., Verts and Carraway 1998). There is only one documented Fringed Myotis location on the McKenzie River Ranger District about nine miles west of the Flat Country Project Area in the Blue River Watershed. No tree/snag roost sites have been documented for either of these species by the Forest Service in the project area or on the Willamette National Forest, and such sites are very difficult to detect. Presence and use of the Flat Country Project Area by both of these species is likely. Single individuals of the fringed myotis may use available forage and roost habitat throughout the summer and early fall in or adjacent to areas where the proposed Flat Country project would occur.

The current composition of habitat throughout the project area consists of young and mature Douglas-fir forest stands. Most of these stands contain a fairly dense canopy cover of over 60%, which makes them of low quality for bats. Bats are known to use edge habitat for commuting and foraging more frequently than forests or open habitat, which is likely a function of avoiding dense forest habitat and areas where some types of insect prey abundance may be reduced, and avoiding wide open habitat where they have a high risk of being preyed on (Hayes 2003).

Field Reconnaissance: There are no caves, mines, or buildings that would serve as suitable hibernacula, nor are there known roost sites associated with other structures within 250 feet that would be affected by proposed activities. Field reviews showed the current snag or potential roosting habitat condition within the proposed harvest units is moderate to better with over three large snags per acre in about half of the stands (Table 6). This snag habitat is associated with the older mature stands. The existing plantations to be thinned generally have very few or no large snags.



Direct and Indirect Effects: The effects of Alternatives 1, 2, and 3 on these bats considered a) changes to foraging habitat, b) changes to roosting structures, c) potential for direct mortality to bats, and d) amount of roosting habitat affected.

Alternative 1 would have no direct effect on bat foraging or roosting habitat, and no risk of direct mortality to bats. The 1833 acres of younger stands under 80 years old would take over 100 years to begin the transition to old-growth forest which provides high quality roosting habitat for bats.

Changes to foraging habitat: Bats readily fly, forage over large areas, and use a variety of habitats for foraging including open and forested areas. About 1833 acres would be thinned with **Alternative 2**, although some additional skips would be left for habitat diversity and for various other resource protective measures. Within those areas, Alternative 2 would also create ~322 acres of open forested habitat with some remaining green trees in small gaps. The site-specific effect of these changes to bat foraging habitat is uncertain, and could range from negative to beneficial. The magnitude of the effects on foraging habitat at the landscape and forest level scales are insignificant, however, because Alternative 2 harvest acres affects ~6 percent of the Flat Country Project Area, and about 0.3 percent of the Willamette National Forest.

Amount of roosting habitat affected/Changes to roosting structures: Proposed harvest units under 80 years of age currently contain little to no snag habitat, and only very few if any potential bat roosting trees/snags that may be used by bats would be lost with Alternative 2. Loss of danger trees larger than 12" diameter which may have some bat roosting crevices along the haul route may also impact individual roost trees or snags used by bats.

Wildlife tree creation, which will benefit bat roosting habitat in the long-term, is required mitigation on 1535 acres (18 out of 108 units) at the rate of 2-4/acre (EIS Chapter 2, Mitigation and Enhancement

Included in Alternative 2, see also Table below). Wildlife tree creation is further recommended as an enhancement on an additional 2554 acres at a rate of 1-4 per acre (73 out of 108 units). The intent of this activity is to help augment reduced levels of snags and large down wood as a result of past harvest across the entire landscape. Existing managed plantations generally do not contain any snags. Wildlife tree and large down wood creation will occur as an enhancement if funding is available. Mitigation work will occur.

The following units are proposed for shelterwood harvest and are currently unmanaged stands. They will have snag/large down wood creation as a mitigation measure, and are also shown in bold font in Table below): 10, 300, 1110, 1450, 1480, 1520, 1710, 1810, 1820, 1830, 1970, 1980, 2010, 2030, 2040, 2060, 2120, and 2160.

Some units have habitat mitigation measures recommended in riparian reserves. Other units have snag/down wood creation recommended as an enhancement measure and implementation is dependent on funding. Units with no recommendations for additional snag and large down wood creation generally have small diameters under 14" dbh.

Units 1160, 1170, 1180 and 1190 are in a 9D Special Habitat Area/Bunchgrass Meadow and will have many scattered snags and high amounts of large down wood after treatment where mature sized trees are removed.

Table 16. *Wildlife Tree and Large Down Wood Mitigation and Enhancement Recommendations Included in Alternatives 2 and 3.*

Unit	Land Allocation/Critical Habitat (CH)/other criteria	Wildlife Tree Creation per acre	Large Down Wood Creation per acre
10	Matrix, Shelterwood	2	1
50	Matrix	2	1
70	Matrix	2	2
80	Matrix	1	1
90	Matrix	None	1
110	Matrix	2	2
140	Matrix, CH	4	2
160	Matrix, CH	4	2
180	Matrix, CH	2	2
190	Matrix, CH	4	2
210	Matrix	None	1
250	Matrix	1	2 clumped in riparian
260	Matrix	None	None
300	Matrix, Shelterwood	2	2
310	Matrix	1	1
350	Matrix, CH	4	4
360	Matrix, CH	4	4
440	Matrix	None	2
460	Matrix	1	1
470	Matrix	2	2

Unit	Land Allocation/Critical Habitat (CH)/other criteria	Wildlife Tree Creation per acre	Large Down Wood Creation per acre
480	Matrix	2	2
490	Matrix	2	2
1020	Matrix	2 most on ridgetop	2
1040	Matrix	None	None
1050	Matrix	1	2
1070	Matrix	4	2
1090	Matrix	1	1
1100	Matrix	1	1
1110	Matrix, Shelterwood	4	4
1120	Matrix, CH	4	4
1130	Matrix, CH	4	4
1140	Matrix, CH	4	4
1150	Matrix, CH	2	2
1160	9D Special Habitat Area, Bunchgrass Meadow	>10	>10
1170	9D Special Habitat Area, Bunchgrass Meadow	>10	>10
1180	9D Special Habitat Area, Bunchgrass Meadow	>10	>10
1190	9D Special Habitat Area, Bunchgrass Meadow, CH	>10	>10
1200	Matrix, CH	4	2
1210	Matrix, CH	None	2
1220	Matrix	4	4
1230	Matrix, CH	2	2
1240	Matrix	2	2
1260	Matrix, CH	4	4
1270	Matrix, CH	2	2
1280	Matrix, CH	4	4
1300	Matrix, CH	4	4
1310	Matrix, CH	4	4
1320	Matrix, CH	4	4
1330	Matrix, CH	4	4
1340	Matrix, CH	4	4
1350	Matrix, CH	1	1
1360	Matrix	1	1
1370	Matrix	1	1
1380	Matrix, CH	2	2
1400	Matrix, CH	2	4
1410	Matrix, CH	1	1
1420	Matrix	1	1
1430	Matrix	None	2

Unit	Land Allocation/Critical Habitat (CH)/other criteria	Wildlife Tree Creation per acre	Large Down Wood Creation per acre
1440	Matrix	None	None
1450	Matrix, Shelterwood	2	2
1480	Matrix, Shelterwood	2	2
1500	Matrix	None	None
1510	Matrix	2	2
1520	Matrix, Shelterwood	2	2
1530	Matrix	1	1
1540	Matrix	4	2
1550	Matrix	1	2
1560	Matrix	None	2
1580	Matrix	None	1
1590	Matrix	2	2
1600	Matrix	2	2
1610	Matrix	2	2
1640	Matrix, Huckleberry enhancement in shelterwood	NA	NA
1650	Matrix, Rockpit expansion	None	None
1660	Matrix	2	2
1670	Matrix	1	2
1680	Matrix	4	4
1690	Matrix	1	1
1700	Matrix	2	2
1710	Matrix, CH, Shelterwood	4	2
1720	Matrix	2	4
1730	Matrix	2	4
1750	Matrix	4 most on ridgetop	2
1770	Matrix	2	None
1780	Matrix, Meadow enhancement	NA	NA
1810	Matrix, Shelterwood	2	2
1820	Matrix, Shelterwood	4	4
1830	Matrix, Shelterwood	2	1
1860	Matrix, Rockpit expansion	None	None
1870	Matrix, CH	2	4
1880	Matrix, CH	4	4
1900	Matrix, CH	4	4
1910	Matrix, CH	4	4
1920	Matrix, CH	4	4
1940	Matrix, CH	2	2
1950	Matrix, CH	2	2
1960	Matrix, CH west side	4 in CH; 1	1

Unit	Land Allocation/Critical Habitat (CH)/other criteria	Wildlife Tree Creation per acre	Large Down Wood Creation per acre
		elsewhere	
1970	Matrix, Shelterwood	4	4
1980	Matrix, Shelterwood	4	4
2010	Matrix, Shelterwood	2	4
2020	Matrix	4	4
2030	Matrix, Shelterwood	2	1
2040	Matrix, Shelterwood	2	1
2060	Matrix, Shelterwood	4	4
2110	Matrix	4	4
2111	Matrix, Western edge in deficient owl nest core	2	2
2112	Matrix, In deficient owl nest core, CH on western edge	4	4
2120	Matrix, Shelterwood	4	1
2130	Matrix	2	2
2140	Matrix, CH	4	4
2160	Matrix, CH partially, Shelterwood	4	4 in CH, 2 outside CH
2170	Matrix, CH	4	2
2180	Matrix, CH	2	2
2190	Matrix	2	2
2200	Matrix	4	4

Potential for direct mortality to bats: Fringed myotis have strong fidelity to natal roost sites and pups are weaned by the end of July to the end of August depending on various factors, such as lateness of spring (Ormsbee pers. comm.). If snags or trees used as natal sites are fallen prior to that time, it is likely that some or all the pups and adults would be killed. Mitigation measures would protect some snags, but some would be fallen for safety and operational reasons. Some logging may occur before pups are weaned in late summer, especially in years when parturition is delayed. Thus there is a possibility that direct mortality to bat pups could occur as a result of timber harvest in Alternative 2. For an uncommon species, loss of a natal colony could have significant impacts on the viability of the species at the Forest Level. Mature and old-growth trees or snags that have a higher probability of bat roost crevices would only be cut with the Flat Country project if they are safety hazards along roads or stands adjacent to units. The possibility of a bat natal colony being directly harmed by logging is extremely low, because these bat species are thought to be relatively uncommon and natal colonies occur at low densities on the landscape.

Up to 2021 acres of post-harvest prescribed underburning may kill a small number of green trees or burn large snags in adjacent stands which may be additional loss of large tree/snag bat roosting habitat. However, generally the underburning will take place in spring conditions when fuels are somewhat moist, and it should not cause loss of much habitat. Tree mortality would in the longer term lead to the

creation of suitable bat roosting habitat once the tree bark begins to peel off from the tree, leaving suitable bat roosting crevices.

There is a small risk that any snag or hazard tree cutting due to operating and safety concerns would negatively impact these bat species. While it is likely that bats would escape if trees or snags they are roosting in are cut, this could also cause mortality.

Cumulative Effects: The evaluation above incorporates past Forest Service activities in the Flat Country Project Area in the analysis of the current condition (e.g. estimate of potential bat roosting habitat available accounts for past timber harvest) and assumed all of the younger stands are unsuitable for bat tree roosting. Other currently ongoing activities in the Flat Country Project Area that could have resulted in impacts to bat habitat are the Rosco EIS, Olallie Thin, and the Southfork EA Cupola Unit, the latter of which is still ongoing (EIS Appendix F). Other projects listed as Past, Present and Future Activities would not remove older stands and there is a low to zero likelihood of removal of bat roosting habitat. Other than scattered roadside danger tree removal and very minor impacts to large trees and snags in older adjacent stands, there would be no other effects to higher quality bat habitat in older forest stands in the Flat Country Project Area.

Current Standards and Guidelines governing management of the landscape in watersheds surrounding the project area provide direction for long-term maintenance of the amount and distribution of suitable habitat for Fringed Myotis and Townsend's Big-Eared bat. Because of the range and location of land allocations in this area, it is unlikely that cumulative effects would influence the ability of local populations to persist, or become established, by eliminating demographic linkages beyond the species' dispersal capabilities. Cumulative effects of this project on roosting or foraging habitat as it pertains directly to this species would be immeasurable on a landscape scale.

Because effects to bat foraging and potential tree roosting and natal habitat are very minor at the watershed and Forest scale, and because the probability of falling a tree or snag containing a natal colony or family is so low, it is my determination that, **for Fringed Myotis and Townsend's big-eared bats, Alternative 2 may impact individuals, but would not likely result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Alternative 1 would have no impact on these bat species.**

Design Criteria: Ensure that current large snag, defective tree, and down wood habitat is protected to the greatest extent feasible. Additional snag/wildlife tree habitat as mitigation and enhancement is recommended (EIS Chapter 2 Mitigation and Enhancement Included in Alternative 2).

Sierra Nevada Red Fox

Determination: *Benefits may occur in potential habitat due to increased stand diversity which would benefit the Sierra Nevada Red Fox and its' prey. Roadside hazardous fuels treatments have both negative impacts by reducing habitat quality in treated areas from understory cutting and burning, while reducing the risk of stand-replacing fires.*

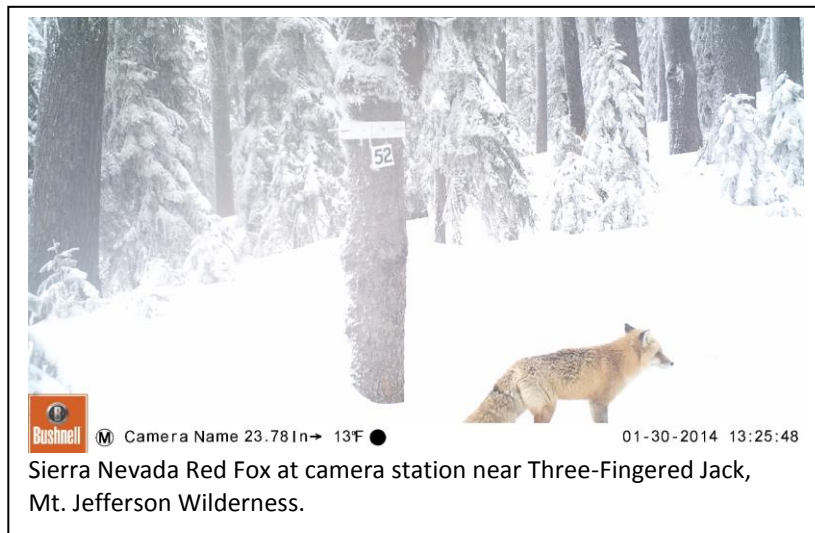
Brief Ecological Overview: The Sierra Nevada Red Fox is one of ten subspecies of red fox recognized in North America. Historically this species of fox occupied high-elevation areas of the Sierra Nevada and Cascade Mountains through Oregon as far north as the Columbia River. This subspecies is believed to occur at a very low density (Perrine et al. 2010). Little is known about the ecology of the Sierra Nevada Red Fox. It is found in alpine and subalpine habitats at higher elevations including meadows, dense

mature forests, and talus. They are associated with mature, closed-canopy forests during winter. Forest openings are important habitat components because they provide habitat for a majority of the fox's prey base. This species uses habitats generally above 4000', and may use lower elevations in winter.

Pre-field Review/Field Reconnaissance: There is one record of a Sierra Nevada Red Fox from 2012 off hwy 242 (NRIS, accessed June 8, 2019) just outside the Flat Country Project boundary. This location is about 6 miles from the nearest proposed Flat Country activity.

Direct and Indirect Effects: The proposed Flat Country Project would harvest about 1700 acres above 4000 feet in potential Sierra Nevada Red Fox habitat. In addition, about 770 acres of roadside hazardous fuels treatments and about 205 acres of meadow restoration would occur above 4000 feet.

The logging activities would maintain older forest structural elements such as snags, large down wood, and small no-harvest skips along streams and small patches within stands. This is expected to result in a diverse stand structure which would still provide hiding cover for foxes and habitat niches for their prey.



Roadside hazardous fuels treatments would result in a rather open understory within 150 and 300 feet of treated roads. While there would still be some amount of large down wood on the ground to provide hiding cover, the more open stand would provide lower quality habitat for the prey base. Foxes may also be less likely to use that area until understory shrubs and conifers return. However, these hazardous fuels reduction activities may also help prevent larger stand-replacing fires, and thus indirectly benefit foxes.

The Bunchgrass Meadow restoration would result in a more open area and less hiding cover, but is expected to provide overall benefits because the meadow community would be restored which benefits fox prey. If Sierra Nevada Red Fox find adequate snowshoe hares as prey at higher elevations, then they may not need to use lower elevation areas. The McKenzie River Ranger District shows an abundance of snowshoe hare tracks during winter, which would support that hypothesis.

Design Criteria/Recommendations: Design stands to enhance horizontal and vertical diversity which includes skips around patches of older trees, wildlife tree and large down wood creation, and creation of small gaps. Retain three to five unburned piles along the edge furthest from the road as a critter/prey base enhancement. Continue to document any additional sightings to contribute to baseline data about this species.

Recommended Seasonal Restrictions

Seasonal restrictions should be reviewed annually throughout the life of this project to determine if any additional seasonal restrictions are needed, or possibly existing ones may be lifted.

If seasonal restrictions cannot be implemented, this BE as well as the EIS and Decision Notice should be updated to reflect additional effects. This does not apply if the wildlife biologist waives the seasonal restrictions prior to operations, i.e. adequate surveys indicate non-occupancy or non-nesting status during the year of operations.

Table 17. Recommended seasonal restrictions for Flat Country Project Alternatives 2 and 3. If seasonal restrictions cannot be implemented, impacts to species may increase. Seasonal restrictions for spotted owls are required, and those for peregrine falcons are recommended. Enhancement project units are shaded light orange.

Unit #	Spotted Owls: Chainsaw use and yarding (65 yds around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Helicopter use (265 yards around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Prescribed burning (0.25 miles around 300m nest patch or other recent nest/pair locations)	Peregrine Falcons-ground- based operations within secondary mgt zone	Peregrine Falcons- helicopter operations within tertiary mgt zone
10	None	NA	None	NA	NA
50	None	NA	None	NA	NA
70	None	NA	None	NA	NA
80	None	NA	None	NA	NA
90	None	NA	None	NA	NA
110	None	NA	None	NA	NA
140	None	NA	None	NA	NA
160	None	NA	None	NA	NA
180	None	NA	None	NA	NA
190	None	NA	None	NA	NA
210	None	NA	None	NA	NA
250	None	NA	None	NA	NA
260	None	NA	None	NA	NA
300	None	NA	None	NA	NA
310	None	NA	None	NA	NA
350	None	NA	None	NA	NA
360	None	NA	None	NA	NA
440	None	NA	None	NA	NA
460	None	NA	None	NA	NA
470	None	NA	None	NA	NA
480	None	NA	None	NA	NA
490	None	NA	None	January 1-July 15	NA
1020	None	NA	None	NA	NA
1040	None	NA	None	NA	NA
1050	None	NA	None	NA	NA
1070	None	NA	None	NA	NA
1090	None	NA	None	NA	NA
1100	None	NA	None	NA	NA
1110	None	NA	None	NA	NA

Unit #	Spotted Owls: Chainsaw use and yarding (65 yds around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Helicopter use (265 yards around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Prescribed burning (0.25 miles around 300m nest patch or other recent nest/pair locations)	Peregrine Falcons-ground- based operations within secondary mgt zone	Peregrine Falcons- helicopter operations within tertiary mgt zone
1120	None	NA	None	NA	NA
1130	None	NA	None	NA	NA
1140	None	NA	None	NA	NA
1150	None	NA	None	NA	NA
1200	None	NA	None	NA	NA
1210	None	NA	None	NA	NA
1220	None	NA	None	NA	NA
1230	None	NA	None	NA	NA
1240	None	NA	None	NA	NA
1260	None	NA	None	NA	NA
1270	None	NA	None	NA	NA
1280	None	NA	None	NA	NA
1300	None	NA	None	NA	NA
1310	None	NA	None	NA	NA
1320	None	NA	None	NA	NA
1330	None	NA	None	NA	NA
1340	None	NA	None	NA	NA
1350	None	None	None	None	None
1360	None	NA	None	NA	NA
1370	None	NA	None	NA	NA
1380	None	NA	None	NA	NA
1400	None	NA	None	NA	NA
1410	None	NA	None	NA	NA
1420	None	NA	None	NA	NA
1430	None	NA	None	NA	NA
1440	None	NA	None	NA	NA
1450	None	NA	None	NA	NA
1480	None	NA	None	NA	NA
1500	None	NA	None	NA	NA
1510	None	NA	None	NA	NA
1520	None	NA	None	NA	NA
1530	None	NA	None	NA	NA
1540	None	NA	None	NA	NA
1550	None	NA	None	NA	NA
1560	None	NA	None	NA	NA
1580	None	NA	None	NA	NA
1590	None	NA	None	NA	NA
1600	None	NA	None	NA	NA
1610	None	NA	None	NA	NA

Unit #	Spotted Owls: Chainsaw use and yarding (65 yds around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Helicopter use (265 yards around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Prescribed burning (0.25 miles around 300m nest patch or other recent nest/pair locations)	Peregrine Falcons-ground- based operations within secondary mgt zone	Peregrine Falcons- helicopter operations within tertiary mgt zone
1640	None	NA	None	NA	NA
1650	None	NA	None	NA	NA
1660	None	NA	None	NA	NA
1670	None	NA	None	NA	NA
1680	None	NA	None	NA	NA
1690	None	NA	None	NA	NA
1700	None	NA	None	NA	NA
1710	None	NA	None	NA	NA
1720	None	NA	None	NA	NA
1730	None	NA	None	NA	NA
1750	None	NA	None	NA	NA
1770	None	NA	None	NA	NA
1780	None	NA	None	NA	NA
1810	None	NA	None	NA	NA
1820	None	NA	None	NA	NA
1830	None	NA	None	NA	NA
1860	None	NA	None	NA	NA
1870	None	None	None	None	None
1880	None	None	None	None	None
1900	None	NA	None	NA	NA
1910	None	NA	None	NA	NA
1920	None	NA	None	NA	NA
1940	None	NA	None	NA	NA
1950	None	NA	None	NA	NA
1960	None	NA	None	NA	NA
1970	None	NA	None	NA	NA
1980	None	NA	None	NA	NA
2010	None	NA	None	NA	NA
2020	None	NA	None	NA	NA
2030	None	NA	None	NA	NA
2040	None	NA	None	NA	NA
2060	None	NA	None	NA	NA
2110	None	NA	None	NA	NA
2111	None	NA	None	NA	NA
2112	None	NA	None	NA	NA
2120	None	NA	None	NA	NA
2130	None	NA	None	NA	NA
2140	None	NA	None	NA	NA
2160	None	NA	None	NA	NA

Unit #	Spotted Owls: Chainsaw use and yarding (65 yds around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Helicopter use (265 yards around 300m nest patch or other recent nest/pair locations)	Spotted Owls: Prescribed burning (0.25 miles around 300m nest patch or other recent nest/pair locations)	Peregrine Falcons-ground- based operations within secondary mgt zone	Peregrine Falcons- helicopter operations within tertiary mgt zone
2170	None	NA	None	NA	NA
2180	None	NA	None	NA	NA
2190	None	NA	None	NA	NA
2200	None	NA	None	NA	NA
Roadside Fuels Reduction Treatments	March 1-July 15 surrounding four occupied nest patches. Check in with wildlife biologist before operations for most current information. Cutting is not allowed in nest patches, RA32 habitat and deficient nest cores.	NA	March 1-July 15 surrounding occupied nest patches. Check in with wildlife biologist before operations for most current information	January 1-July 15: 0.7 miles on road 2647; 1.3 miles on road 2649. A map will be provided prior to implementation.	NA
Bunchgrass Meadow	None	None	None	None	None
Roadside Hazard Tree Felling	No felling of large trees in occupied 300m spotted owl nest patches from March 1-July 15 (required mitigation) unless they are non-nesting in the year of operation. Minor roadside tree felling is allowed. Implement outside the critical nesting seasonal restriction period for cavity nesters from April 1-June 30 (recommendation).				

NA=not applicable, activity is not planned so there is no restriction. If conditions change, i.e. helicopters are later being considered, then effects and seasonal restrictions must be reassessed.

None=activity is or may be planned, but no seasonal restriction is needed

Great Gray Owl: No longer a special status species, this is a Northwest Forest Plan protection buffer species and the tree felling and burning work proposed for Bunchgrass Meadow should not occur within the nesting season because surveys have not been conducted and presence and nesting is possible. The seasonal restriction for great gray owls is March 1-July 1 which is the most critical time for nesting.

Roadwork that lasts over 4 hours in one location: Flat Country Project associated roadwork that lasts over 4 hours in one location may require a seasonal restriction between January 15-July 15. The seasonal restriction may be waived if the location and timeframe are reviewed by the wildlife biologist

and meet the criteria of the Biological Opinion for the northern spotted owl. Recommendations for seasonal restrictions for other sensitive species and raptors should be reviewed and decided on by the district ranger.

Summary of Effects to Threatened, Proposed and Sensitive Species

For eleven Special Status species that have habitat or potential habitat in the project area, the proposed action May Affect, and is likely to adversely affect one species. There would be no impact to three species. The proposed action may adversely impact individuals, but would maintain the viability of the remaining seven species. Five species would benefit from some of the proposed actions in the long-term (Table 18).

Table 18. Summary of Effects of Alternatives 2 and 3 for Eleven Special Status Species that Occur or Have Potential Habitat in the Flat Country Project Area.

SPECIES	Effect Determination For Alts. 2 and 3*	Rationale For Determination
Northern Spotted Owl	May affect, likely to adversely affect. Beneficial impact from thinning of non-habitat and structural dead wood mitigation and enhancement	Loss and downgrading of nesting, foraging and dispersal habitat. Thinning of non-habitat will enhance tree growth, and allow spotted owls to more easily fly through stands. Wildlife tree and large down wood mitigation and enhancement will benefit the prey base.
Bufflehead	No Impact	No potential nesting snags over 18" dbh would be cut.
American Peregrine Falcon	No Impact	Proposed harvest treatments, hazardous fuels treatments and meadow restoration would be neutral to falcon foraging habitat. Seasonal restriction on unit 490 in secondary range will prevent disturbance to nearby nest site.
Northern Waterthrush	No Impact	No potential riparian habitat would be modified.
Crater Lake Tightcoil	No impact with recommended 10m stream buffers	Survey data has only detected this species at a single location on the Willamette National Forest and streamside buffers will exceed the recommended 10m in suitable habitat.
Western Bumble Bee	Long-term beneficial impact	Bunchgrass Meadow Restoration which is part of Flat Country will maintain and improve habitat in the long-term
Mardon Skipper	Long-term beneficial impact	Bunchgrass Meadow Restoration which is part of Flat Country will maintain and improve potential habitat in the long-term
Fisher	No negative impact Long-term beneficial impact	Fishers are unlikely to occur in the project area and the scale of the alternatives, which would impact between 5 percent to 24 percent of 4 hypothetical female home ranges, would not preclude them from reestablishing in the watershed. In the long-term, Fisher habitat quality may benefit from year-round road closures and large down wood mitigation and

SPECIES	Effect Determination For Alts. 2 and 3*	Rationale For Determination
		enhancement.
Fringed Myotis and Townsend's Big-eared Bats	NLCT	Effects to foraging habitat and potential tree roosting and natal habitat is minor at the project area, watershed and Forest scale. Probability that an occupied roost or natal site would be fallen during logging or hazard tree felling operations is low.
Sierra Nevada Red Fox	NLCT Long-term beneficial impact	Roadside hazardous fuels reduction would decrease habitat quality while also reducing the risk of stand-replacing fires. Benefits may occur in potential habitat due to increased edge habitat for hunting and meadow restoration which benefits prey.

* B = breeding (nesting/denning) habitat, R = roosting/cover habitat, F = foraging habitat, D = dispersal habitat

Effects Key:

NI / NE= No Impact for Sensitive Species. **No E**ffect for TE species.

LAA=Likely to Adversely Affect.

NLAA= Not Likely to Adversely Affect.

NLCT = May impact individuals or their habitat, but the action will **Not Likely C**ontribute to a **T**rend towards Federal Listing or loss of viability to the population or species.

MCT = May impact individuals or their habitat, with a consequence that the action **May C**ontribute to a **T**rend towards Federal Listing or a loss of viability to the population or species.

BI = **B**eneficial **I**mpact.

Required Mitigation Measures to Avoid or Reduce Adverse Effects

To protect nesting spotted owls, and maintain future habitat:

- The following six sites will need continued surveys until harvest implementation to avoid take on an individual owl pair: 0826, 2838, 2421, 2408, 1738, and 2834.
- Protect all potential nest trees which may be found in older stands and are generally >50" dbh, have broken tops, and large branches. Many such large nest trees within units that were not RA32 patches were GPSed and mapped for retention.
- Implement seasonal restrictions as shown above.
- 65 acres of RA32 habitat within units has been mapped and identified for retention.
- Do not place unit landings on mapped RA32 habitat (mapped and provided to timber management).
- No yarding is allowed through mapped RA32 habitat.
- No roadside hazardous fuels reduction treatments are allowed in 300m nest patches or RA32 habitat. A map will be provided to fire personnel prior to treatments and communication with the wildlife biologist shall occur in the year of operation in case any updates are needed.

Recommended Conservation Measures to Avoid, Minimize or Mitigate Adverse Effects

To provide for Pacific Fisher and Sierra Nevada Red Fox habitat:

- Retain down log habitat as described in the prescription. If it is not present after logging is completed, trees should be felled until the prescription has been met.
- Design stands to enhance horizontal and vertical diversity which includes skips around patches of older trees, wildlife tree and large down wood creation, and creation of small gaps.
- Implement road closures as planned, as soon as possible after logging is completed.

- k) Retain three to five unburned piles per acre along the edge furthest from the road as a critter/prey base enhancement for the roadside hazardous fuels reduction treatments.
- l) Retain three to five unburned slash piles per acre in units where piling treatments occur.

To provide for bat snag roosting habitat:

- m) Retain existing snags where possible, except those needed to be fallen for safety or operational reasons.
- n) High-density snag patches have been mapped in selected units and will be marked for retention skips. Additional such snag patches should be protected if found during sale layout.
- o) Implement the snag mitigation and enhancement displayed in Table 16 above.

To reduce the impacts to Johnson's Hairstreak Butterfly:

- p) During layout, mark for retention any western hemlock trees that are identified containing dwarf mistletoe.

To provide protection for Crater Lake Tightcoil habitat:

- q) Prohibit work within 10 meters of perennially wet areas in harvest units and for roadside fuels reduction treatments.

To protect nesting raptors and cavity nesters:

- r) Implement seasonal restrictions as shown above.

Prepared by:

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